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OFFICE CONSOLIDATION

Regulation under the

Building Code Act, 1992

CODIFICATION ADMINISTRATIVE

Règlement pris en application de la

Loi de 1992 sur le code du bâtiment

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(O. Reg. 350/06)

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Building Code Act, 1992
Loi de 1992 sur le code du bâtiment

ONTARIO REGULATION 350/06

No Amendments

BUILDING CODE

Note: This Regulation comes into force on December 31, 2006. See: O. Reg. 350/06, Division C, Part 4, s. 4.3.

DIVISION A
COMPLIANCE, OBJECTIVES AND FUNCTIONAL STATEMENTS

PART 1
COMPLIANCE AND GENERAL

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Section 1.1. Organization and Application

1.1.1. Organization of this Code

1.1.1.1. Scope of Division A

(1) Division A contains compliance and application provisions and the *objectives* and *functional statements* of this Code.

1.1.1.2. Scope of Division B

(1) Division B contains the *acceptable solutions* of this Code.

1.1.1.3. Scope of Division C

(1) Division C contains the administrative provisions of this Code.

1.1.1.4. Internal Cross-references

(1) If a provision of this Code contains a reference to another provision of this Code but no Division is specified, both provisions are in the same Division of this Code.

1.1.2. Application of Division B

1.1.2.1. Application of Parts 1, 7 and 12

(1) Parts 1, 7 and 12 of Division B apply to all *buildings*.

1.1.2.2. Application of Parts 3, 4, 5 and 6

(1) Subject to Articles 1.1.2.6. and 1.3.1.2., Parts 3, 5 and 6 of Division B apply to all *buildings*,

(a) used for *major occupancies* classified as,

(i) Group A, *assembly occupancies*,

(ii) Group B, *care or detention occupancies*,

(iii) Group F, Division 1, *high hazard industrial occupancies*, or

(b) exceeding 600 m^2 in *building area* or exceeding three *storeys* in *building height* and used for *major occupancies* classified as,

(i) Group C, *residential occupancies*,

(ii) Group D, *business and personal services occupancies*,

(iii) Group E, *mercantile occupancies*, or

(iv) Group F, Divisions 2 and 3, *medium* and *low hazard industrial occupancies*.

(2) Subject to Articles 1.1.2.6. and 1.3.1.2., Part 4 of Division B applies to,

(a) *post-disaster buildings*,

(b) *buildings* described in Sentence (1), and

(c) structures designated in Sentence 1.3.1.1.(1).

(3) Section 3.11. of Division B applies to *public pools*.

(4) Section 3.12. of Division B applies to *public spas*.

(5) Section 3.15. of Division B applies to signs.

1.1.2.3. Application of Part 8

(1) Part 8 of Division B applies to the *construction*, operation and maintenance of all *sewage systems* and to the *construction* of *buildings* in the vicinity of *sewage systems*.

1.1.2.4. Application of Part 9

(1) Subject to Articles 1.1.2.6. and 1.3.1.2., Part 9 of Division B applies to all *buildings*,

(a) of three or fewer *storeys* in *building height*,

(b) having a *building area* not exceeding 600 m^2, and

(c) used for *major occupancies* classified as,

(i) Group C, *residential occupancies*,

(ii) Group D, *business and personal services occupancies*,

(iii) Group E, *mercantile occupancies*, or

(iv) Group F, Divisions 2 and 3, *medium and low hazard industrial occupancies*.

1.1.2.5. Application of Part 10

(1) Part 10 of Division B applies to existing *buildings* requiring a permit under section 10 of the Act.

1.1.2.6. Application of Part 11

(1) Except as provided in Sentence (2), Part 11 of Division B applies to the design and *construction* of existing *buildings*, or parts of existing *buildings*, that have been in existence for at least five years.

(2) If a *building* has been in existence for at least five years but includes an addition that has been in existence for less than five years, Part 11 of Division B applies to the entire *building*.

1.1.2.7. Existing Buildings

(1) Except as provided in Section 3.17. of Division B, Article 7.1.2.2. of Division B, Section 9.40. of Division B and Part 11 of Division B, if an existing *building* is extended or is subject to material alteration or repair, this Code applies only to the design and *construction* of the extensions and those parts of the *building* that are subject to the material alteration or repair.

(2) If an existing previously occupied *building* is moved from its original location to be installed elsewhere, or is dismantled at its original location and moved to be reconstituted elsewhere, this Code applies only to changes to the design and *construction* of the *building* required as a result of moving the *building*.

1.1.3. Building Size Determination

1.1.3.1. Building Size Determination of Building Divided by Firewalls

(1) Where a *firewall* divides a *building*, each portion of the *building* that is divided shall be considered as a separate *building*, except for the purposes of,

(a) a determination of *gross area* in Section 2.2. of Division C,

(b) a fire alarm and detection system in Sentence 3.2.4.2.(1) of Division B or Article 9.10.18.1. of Division B, and

(c) a *plumbing system* interconnected through a *firewall*.

1.1.3.2. Building Size Determination of Building Divided by Vertical Fire Separations

(1) Except as permitted in Sentence (2), if portions of a *building* are completely separated by a vertical *fire separation* that has a *fire-resistance rating* of at least 1 h and that extends through all *storeys* and *service spaces* of the separate portions, each separated portion may be considered to be a separate *building* for the purpose of determining *building height* if,

(a) each separated portion is not more than three *storeys* in *building height* and is used only for *residential occupancies*, and

(b) the unobstructed path of travel for a fire fighter from the nearest *street* to one entrance to each separated portion is not more than 45 m.

(2) The vertical *fire separation* in Sentence (1) may terminate at the floor assembly immediately above a *basement* if the *basement* conforms to Article 3.2.1.2. of Division B.

Section 1.2. Compliance

1.2.1. Compliance with Division B

1.2.1.1 Compliance with Division B

(1) Compliance with Division B shall be achieved,

(a) by complying with the applicable *acceptable solutions* in Division B, or

(b) by using *alternative solutions* that will achieve the level of performance required by the applicable *acceptable solutions* in respect of the *objectives* and *functional statements* attributed to the applicable *acceptable solutions* in Supplementary Standard SA-1.

(2) For the purposes of Clause (1)(b), the level of performance in respect of a *functional statement* refers to the performance of the *functional statement* as it relates to the *objective* with which it is associated in Supplementary Standard SA-1.

1.2.2. Materials, Appliances, Systems and Equipment

1.2.2.1. Characteristics of Materials, Appliances, Systems and Equipment

(1) All materials, *appliances*, systems and equipment installed to meet the requirements of this Code shall possess the necessary characteristics to perform their intended functions when installed in a *building*.

1.2.2.2. Used Materials, Appliances and Equipment

(1) Unless otherwise specified, recycled materials in *building* products may be used and used materials, *appliances* and equipment may be reused when they meet the requirements of this Code for new materials and are satisfactory for their intended use.

Section 1.3. Interpretation

1.3.1. Interpretation

1.3.1.1. Designated Structures

(1) The following structures are designated for the purposes of clause (d) of the definition of *building* in subsection 1 (1) of the Act:

(a) a retaining wall exceeding 1 000 mm in exposed height adjacent to,

  (i) public property,

  (ii) access to a *building*, or

  (iii) private property to which the public is admitted,

(b) a pedestrian bridge appurtenant to a *building*,

(c) a crane runway,

(d) an exterior storage tank and its supporting structure that is not regulated by the *Technical Standards and Safety Act, 2000*,

(e) signs regulated by Section 3.15. of Division B that are not structurally supported by a *building*,

(f) a solar collector that is mounted on a *building* and has a face area equal to or greater than 5 m^2,

(g) a structure that supports a wind turbine generator having a rated output of more than 3 kW,

(h) a dish antenna that is mounted on a *building* and has a face area equal to or greater than 5 m^2,

(i) a communication tower exceeding 16.6 m above ground level,

(j) an *outdoor pool* that has a water depth greater than 3.5 m at any point,

(k) a *public pool*, and

(l) a *public spa*.

1.3.1.2. Farm Buildings

(1) Except as provided in Sentences (2) to (5), *farm buildings* shall conform to the requirements in the National Farm Building Code of Canada.

(2) Articles 1.1.1.2. and 3.1.8.1. and Subsections 3.1.4. and 4.1.4. in the National Farm Building Code of Canada do not apply to *farm buildings*.

(3) In the National Farm Building Code of Canada, references in Articles 1.1.1.3., 2.2.2.1., 2.2.2.2., 2.3.1.1., 2.3.2.1., 3.1.1.1., 3.1.1.2., 3.1.2.1. and 3.1.6.1. to the National Building Code of Canada are deemed to be references to Ontario Regulation 403/97 (Building Code) made under the Act, as that regulation read immediately before it was revoked.

(4) A *farm building* of *low human occupancy* having a *building area* not exceeding 600 m^2 and not more than three *storeys* in *building height* is deemed to comply with the structural requirements of the National Farm Building Code of Canada if it is designed and constructed in conformance with Supplementary Standard SB-11.

(5) A manure storage tank shall comply with the requirements of Subsection 4.4.5. of Division B.

Section 1.4. Terms and Abbreviations

1.4.1. Definitions of Words and Phrases

1.4.1.1. Non-defined Terms

(1) Definitions of words and phrases used in this Code that are not included in the list of definitions in Articles 1.4.1.2. and 1.4.1.3. and are not defined in another provision of this Code shall have the meanings that are commonly assigned to them in the context in which they are used, taking into account the specialized use of terms by the various trades and professions to which the terminology applies.

1.4.1.2. Defined Terms

(1) Each of the words and terms in italics in this Code has,

(a) the same meaning as in subsection 1 (1) of the Act, if not defined in clause (b), or

(b) the following meaning for the purposes of this Code and, where indicated, for the purposes of the Act:

Absorption trench means an excavation in *soil*, as defined in Part 8 of Division B, or in *leaching bed fill*, being part of a *leaching bed*, in which a *distribution pipe* is laid that allows infiltration of the *effluent* into the *soil*, as defined in Part 8 of Division B, or *leaching bed fill*.

Acceptable solution means a requirement stated in Parts 3 to 12 of Division B.

Accessible means, when applied to a *fixture*, connection, *plumbing appliance*, valve, *cleanout* or equipment, to be accessible with or without having to first remove an access panel, door or similar obstruction, but a *fixture*, connection, *plumbing appliance*, valve, *cleanout* or equipment is not accessible if access can be gained only by cutting or breaking materials.

Access to exit means that part of a *means of egress* within a *floor area* that provides access to an *exit* serving the *floor area*.

Additional circuit vent means a *vent pipe* that is installed between a *circuit vent* and a *relief vent* to provide additional air circulation.

Adfreezing means the adhesion of *soil* to a *foundation unit* resulting from the freezing of *soil* water.

Air admittance valve means a one-way valve designed to allow air to enter the *drainage system* when the pressure in the *plumbing system* is less than the atmospheric pressure.

Air barrier system means an assembly installed to provide a continuous barrier to the movement of air.

Air break means the unobstructed vertical distance between the lowest point of an *indirectly connected waste pipe* and the *flood level rim* of the *fixture* into which it discharges.

Air-conditioning is the process of treating air in a space to control simultaneously its temperature, humidity, cleanliness, and distribution to meet the comfort requirements of the occupants of the space.

Air gap means the unobstructed vertical distance through air between the lowest point of a water supply outlet and the *flood level rim* of the *fixture* or device into which the outlet discharges.

Air-supported structure means a structure consisting of a pliable membrane that achieves and maintains its shape and support by internal air pressure.

Alarm signal means an audible signal transmitted throughout one or more zones of a *building* or throughout a *building* to advise occupants that a fire emergency exists.

Alert signal means an audible signal to advise designated persons of a fire emergency.

Allowable bearing pressure means the maximum pressure that may be safely applied to a *soil* or *rock* by the *foundation unit* considered in design under expected loading and subsurface conditions.

Allowable load means the maximum load that may be safely applied to a *foundation unit* considered in design under expected loading and subsurface conditions.

Alternative measure means a substitute for a requirement of Part 3, 4, 5, 6, 7, 8, 9 or 12 of Division B or for a *compliance alternative*.

Alternative solution means a substitute for an *acceptable solution*.

Appliance means a device to convert fuel into energy and includes all components, controls, wiring and piping required to be part of the device by the applicable standard referred to in this Code.

Architect means, for the purposes of the Act and this Code, the holder of a licence, a certificate of practice or a temporary licence under the *Architects Act*.

Artesian groundwater means a confined body of water under pressure in the ground.

As constructed plans means, for the purposes of the Act and this Code, *construction* plans and specifications that show the *building* and the location of the *building* on the property as the *building* has been constructed.

Assembly occupancy means the *occupancy* or the use of a *building* or part of a *building* by a gathering of persons for civic, political, travel, religious, social, educational, recreational or similar purposes or for the consumption of food or drink.

Attic or roof space means the space between the roof and the ceiling of the top *storey* or between a dwarf wall and a sloping roof.

Auxiliary water supply means, when applied to premises, any water supply on or available to the premises other than the primary *potable* water supply for the premises.

Backflow means a flowing back or reversal of the normal direction of the flow.

Backflow preventer means a device or a method that prevents *backflow* in a *water distribution system*.

Back-siphonage means *backflow* caused by a negative pressure in the supply system.

Back-siphonage preventer means a device or a method that prevents *back-siphonage* in a *water distribution system*.

Back vent means a pipe that is installed to vent a *trap* off the horizontal section of a *fixture* drain or the *vertical leg* of a water closet or other *fixture* that has an integral siphonic flushing action and "*back vented*" has a corresponding meaning.

Backwater valve means a *check valve* designed for use in a gravity *drainage system*.

Barrier-free means, when applied to a *building* and its facilities, that the *building* and its facilities can be approached, entered and used by persons with physical or sensory disabilities.

Basement means one or more *storeys* of a *building* located below the first *storey*.

Bathroom group means a group of plumbing *fixtures* installed in the same room, consisting of one domestic-type lavatory, one water closet and either one bathtub, with or without a shower, or one one-headed shower.

Bearing surface means the contact surface between a *foundation unit* and the *soil* or *rock* on which the *foundation unit* bears.

Boarding, lodging or rooming house means a *building*,

(a) that has a *building height* not exceeding three *storeys* and a *building area* not exceeding 600 m^2,

(b) in which lodging is provided for more than four persons in return for remuneration or for the provision of services or for both, and

(c) in which the lodging rooms do not have both bathrooms and kitchen facilities for the exclusive use of individual occupants.

Boiler means an *appliance* intended to supply hot water or steam for space heating, processing or power purposes.

Bottle trap means a *trap* that retains water in a closed chamber and that seals the water by submerging the inlet pipe in the liquids or by a partition submerged in the liquids.

Branch means a *soil* or *waste pipe* that is connected at its upstream end to the junction of two or more *soil* or *waste pipes* or to a *soil* or *waste stack* and that is connected at its downstream end to another *branch*, a sump, a *soil* or *waste stack* or a *building drain*.

Branch vent means a *vent pipe* that is connected at its lower end to the junction of two or more *vent pipes* and that, at its upper end, is connected to another *branch vent*, a *stack vent*, a *vent stack* or a *header*, or terminates in *open air*.

Breeching means a *flue pipe* or chamber for receiving *flue* gases from one or more *flue* connections and for discharging these gases through a single *flue* connection.

Building area means the greatest horizontal area of a *building* above *grade*,

(a) within the outside surface of exterior walls, or

(b) within the outside surface of exterior walls and the centre line of *firewalls*.

Building Code website means the website at www.obc.mah.gov.on.ca.

Building control valve means the valve on a *water system* that controls the flow of *potable* water from the *water service pipe* to the *water distribution system*.

Building drain means the lowest horizontal piping, including any vertical *offset*, that conducts *sewage*, *clear-water waste* or storm water by gravity to a *building sewer*.

Building height means the number of *storeys* contained between the roof and the floor of the *first storey*.

Building sewer means a *sanitary building sewer* or *storm building sewer*.

Building trap means a *trap* that is installed in a *sanitary building drain* or *sanitary building sewer* to prevent circulation of air between the *sanitary drainage system* and a public sewer.

Business and personal services occupancy means the *occupancy* or use of a *building* or part of a *building* for the transaction of business or the provision of professional or personal services.

Camp for housing of workers means a camp in which *buildings* or other structures or premises are used to accommodate five or more employees.

Campground means land or premises used as an overnight camping facility that is not a *recreational camp*.

Canopy means a roof-like structure projecting more than 300 mm from the exterior face of the *building*.

Care and treatment occupancy (Group B, Division 2) means an *occupancy* in which persons receive special care and treatment.

Care occupancy (Group B, Division 3) means an *occupancy* in which persons receive special or supervisory care because of cognitive or physical limitations, but does not include a *dwelling unit*.

Care or detention occupancy means the *occupancy* or use of a *building* or part of a *building* by persons who,

(a) are dependent on others to release security devices to permit egress,

(b) receive special care and treatment, or

(c) receive supervisory care.

Cavity wall means a construction of masonry units laid with a cavity between the wythes, where the wythes are tied together with metal ties or bonding units and are relied on to act together in resisting lateral loads.

Certificate for the occupancy of a building not fully completed means a certificate described in Sentence 4.7.4.3.(5) of Division C.

Chamber means a structure that is constructed with an open bottom and that contains a pressurized *distribution pipe*.

Check valve means a valve that permits flow in only one direction and prevents a return flow.

Chimney means a shaft that is primarily vertical and that encloses at least one *flue* for conducting *flue* gases to the outdoors.

Chimney liner means a conduit containing a *chimney flue* used as a lining of a *masonry or concrete chimney*.

Circuit vent means a *vent pipe* that serves a number of *fixtures* and connects them to the *fixture drain* of the most upstream *fixture*, and "*circuit vented*" has a corresponding meaning.

Class 1 fire sprinkler/standpipe system mean an assembly of pipes and fittings that conveys water from the *water service pipe* or *fire service main* to the sprinkler/standpipe system's outlets, is *directly connected* to the public water supply main only, has no pumps or reservoirs and in which the sprinkler drains discharge to the atmosphere, to dry wells or to other safe outlets.

Class 2 fire sprinkler/standpipe system means a *Class 1 fire sprinkler/standpipe system* that includes a booster pump in its connection to the public water supply main.

Class 3 fire sprinkler/standpipe system means an assembly of pipes and fittings that conveys *potable* water from the *water service pipe* or *fire service main* to the sprinkler/standpipe system's outlets and that is *directly connected* to the public water supply main and to one or more of the following storage facilities, which are filled from the public water supply main only: elevated water storage, fire pumps supplying water from aboveground covered reservoirs or pressure tanks.

Class 4 fire sprinkler/standpipe system means an assembly of pipes and fittings that conveys water from the *water service pipe* or *fire service main* to the sprinkler/standpipe system's outlets and is *directly connected* to the public water supply main (similar to *Class 1* and *Class 2 fire sprinkler/standpipe systems*) and to an auxiliary water supply dedicated to fire department use that is located within 520 m of a pumper connection.

Class 5 fire sprinkler/standpipe system means an assembly of pipes and fittings that conveys water from the *water service pipe* or *fire service main* to the sprinkler/standpipe system's outlets, is *directly connected* to the public water supply main and is interconnected with an *auxiliary water supply*.

Class 6 fire sprinkler/standpipe system means an assembly of pipes and fittings that conveys water from the *water service pipe* or *fire service main* to the sprinkler/standpipe system's outlets and acts as a combined industrial water supply and fire protection system that is supplied from the public water supply main only, with or without gravity storage or pump suction tanks.

Cleanout means a fitting access in a *drainage system* or *venting system* that is installed to provide access for cleaning and inspection and that is provided with a readily replaceable air tight cover.

Clean water means water that has passed through a *recirculation system*.

Clear water waste means waste water containing no impurities or contaminants that are harmful to a person's health, plant or animal life or that impair the quality of the natural environment.

Closure means a device or assembly for closing an opening through a *fire separation* or an exterior wall, such as a door, a shutter, wired glass and glass block, and includes all components such as hardware, closing devices, frames and anchors.

Combustible means that a material fails to meet the acceptance criteria of CAN4-S114, "Standard Method of Test for Determination of Non-Combustibility in Building Materials".

Combustible construction means a type of construction that does not meet the requirements for *noncombustible construction*.

Compliance alternative means a substitute for a requirement in another Part of Division B that is listed in Part 10 or 11 of Division B, and "*C.A.*" has a corresponding meaning.

Computer room means a room,

(a) that contains electronic computer or data processing equipment such as main frame type,

(b) that is separated from the remainder of the *building* for the purpose of controlling the air quality in the room by a self-contained climate control system, and

(c) that has an *occupant load* of not more than one person for each 40 m^2 of the room.

Conditioned space means space within a *building* in which the temperature is controlled to limit variation in response to the exterior ambient temperature or interior differential temperatures by the provision, either directly or indirectly, of heating or cooling over substantial portions of the year.

Construction index means a level on a scale of 1 to 8 determined in accordance with Table 11.2.1.1.A. of Division B designating the expected *performance level* of the *building* structure with respect to the type of *construction* and fire protection of an existing *building*, and "*C.I.*" has a corresponding meaning.

Contained use area means a supervised area containing one or more rooms in which occupant movement is restricted to a single room by security measures not under the control of the occupant.

Continuous vent means a *vent pipe* that is an extension of a vertical section of a *branch* of *fixture drain*.

Critical level means the level of submergence at which a *back-siphonage preventer* ceases to prevent *back-siphonage*.

Day camp means a camp or resort that admits persons for a continuous period not exceeding twenty-four hours.

Day nursery means a day nursery as defined in the *Day Nurseries Act*.

Dead end means a pipe that terminates with a closed fitting.

Dead load means the weight of all permanent structural and nonstructural components of a *building*.

Deep foundation means a *foundation unit* that provides support for a *building* by transferring loads either by end-bearing to a *soil* or *rock* at considerable depth below the *building* or by adhesion or friction, or both, in the *soil* or *rock* in which it is placed. *Piles* are the most common type of *deep foundation*.

Design activities means the activities described in subsection 15.11 (5) of the Act.

Design bearing pressure means the pressure applied by a *foundation unit* to *soil* or *rock*, which pressure is not greater than the *allowable bearing pressure*.

Design capacity means, in the definition of *sewage system*, the total daily design *sanitary sewage* flow determined in accordance with Article 8.2.1.3. of Division B.

Designer means the person responsible for the design.

Design load means the load applied to a *foundation unit*, which load is not greater than the *allowable load*.

Detention occupancy (Group B, Division 1) means an *occupancy* in which persons are under restraint or are incapable of self preservation because of security measures not under their control.

Developed length means, when applied to a pipe and fittings, the length along the centre line of the pipe and fittings.

Directly connected means physically connected in such a way that neither water nor gas can escape from the connection.

Distributing pipe means a pipe or piping in a *water distribution system*.

Distribution box means a device for ensuring that *effluent* from a *treatment unit* is distributed in equal amounts to each line of *distribution pipe* in a *leaching bed*.

Distribution pipe means a line or lines of perforated or open jointed pipe or tile installed in a *leaching bed* for the purpose of distributing *effluent* from a *treatment unit* to the *soil*, as defined in Part 8 of Division B, or *leaching bed fill* in the *leaching bed*.

Diving board means a flexible board.

Diving platform means a rigid platform that is not a *starting platform*.

Drainage system means an assembly of pipes, fittings, *fixtures* and appurtenances on a property that is used to convey *sewage* and *clear water waste* to a main sewer or a *private sewage disposal system*, and includes a *private sewer*, but does not include *subsoil drainage piping*.

Drinking-water system has the same meaning as in subsection 2 (1) of the *Safe Drinking Water Act, 2002*.

Drum trap means a *trap* whose inlet and outlet are in the sides of the cylindrical body of the *trap*.

Dwelling unit means a *suite* operated as a housekeeping unit, used or intended to be used as a domicile by one or more persons and usually containing cooking, eating, living, sleeping and sanitary facilities.

Earth pit privy means a latrine consisting of an excavation in the ground surmounted by a superstructure.

Effluent means *sanitary sewage* that has passed through a *treatment unit*.

Electric space heating means an electric energy source that provides more than 10 per cent of the heating capacity provided for a *building* and includes,

(a) electric resistance unitary baseboard heating,

(b) electric resistance unitary cabinet heating,

(c) electric resistance ceiling cable or floor cable heating,

(d) electric resistance central furnace heating,

(e) electric hot water space heating, and

(f) air source heat pumps in combination with electric resistance backup heating.

Excavation means the space created by the removal of *soil*, *rock* or *fill* for the purposes of construction.

Exhaust duct means a duct through which air is conveyed from a room or space to the outdoors.

Exit means that part of a *means of egress*, including doorways, that leads from the *floor area* it serves to a separate *building*, an open public thoroughfare or an exterior open space protected from fire exposure from the *building* and having access to an open public thoroughfare.

Exit level means the level of an *exit* stairway in a *building* at which an exterior *exit* door or *exit* passageway leads to the exterior.

Exit storey means a *storey* having an exterior *exit* door in a *building* governed by Subsection 3.2.6. of Division B.

Exposing building face means that part of the exterior wall of a *building* that faces one direction and is located between ground level and the ceiling of its top *storey* or, where the *building* is divided into *fire compartments*, the exterior wall of a *fire compartment* that faces one direction.

Exterior cladding means those components of a *building* that are exposed to the outdoor environment and are intended to provide protection against wind, water or vapour.

Factory-built chimney means a *chimney* consisting entirely of factory-made parts, each designed to be assembled with the other without requiring fabrication on site.

Farm building means all or part of a *building*,

(a) that does not contain any area used for *residential occupancy*,

(b) that is associated with and located on land devoted to the practice of farming, and

(c) that is used essentially for the housing of equipment or livestock or the production, storage or processing of agricultural and horticultural produce or feeds.

Fill means *soil*, *rock*, rubble, industrial waste such as slag, organic material or a combination of these that is transported and placed on the natural surface of a *soil* or *rock* or organic terrain; it may or may not be compacted.

Fire compartment means an enclosed space in a *building*,

(a) that is separated from all other parts of the *building* by enclosing construction that provides a *fire separation*, and

(b) that may be required to have a *fire-resistance rating*.

Fire damper means a *closure* that consists of a normally held open damper installed in an air distribution system or in a wall or floor assembly and designed to close automatically in the event of a fire in order to maintain the integrity of the *fire separation*.

Fire detector means a device that detects a fire condition and automatically initiates an electrical signal to actuate an *alert signal* or *alarm signal* and includes *heat detectors* and *smoke detectors*.

Fire load means, when applied to *occupancy*, the *combustible* contents of a room or *floor area* expressed in terms of the average weight of *combustible* materials per unit area, from which the potential heat liberation may be calculated based on the calorific value of the materials, and includes the furnishings, finished floor, wall and ceiling finishes, trim and temporary and movable *partitions*.

Fire-protection rating means the time in minutes or hours that a *closure* will withstand the passage of flame when exposed to fire under specified conditions of test and performance criteria, or as otherwise prescribed in this Code.

Fire-resistance rating means the time in minutes or hours that a material or assembly of materials will withstand the passage of flame and the transmission of heat when exposed to fire under specified conditions of test and performance criteria, or as determined by extension or interpretation of information derived from that test and performance as prescribed in this Code.

Fire-retardant treated wood means wood or a wood product that has been impregnated with fire-retardant chemicals to reduce its surface-burning characteristics such as flame spread, rate of fuel contribution and the density of smoke developed.

Fire separation means a construction assembly that acts as a barrier against the spread of fire.

Fire service main means a pipe and its appurtenances that are connected to a source of water and that are located on a property,

(a) between the source of water and the base of the riser of a water-based fire protection system,

(b) between the source of water and inlets to foam making systems,

(c) between the source of water and the base elbow of private hydrants or monitor nozzles,

(d) as fire pump suction and discharge piping not within a *building*, or

(e) beginning at the inlet side of the check valve on a gravity or pressure tank.

Fire stop flap means a device that is intended for use in horizontal assemblies required to have a *fire-resistance rating*, that incorporates protective ceiling membranes and that operates to close off a duct opening through the membrane in the event of a fire.

Firewall means a type of *fire separation* of *noncombustible construction* that subdivides a *building* or separates adjoining *buildings* to resist the spread of fire and that has a *fire-resistance rating* as prescribed in this Code and the structural stability to remain intact under fire conditions for the required fire-rated time.

First storey means the *storey* that has its floor closest to *grade* and its ceiling more than 1.8 m above *grade*.

Fixture means a receptacle, *plumbing appliance*, apparatus or other device that discharges *sewage* or *clear water waste*, and includes a floor drain.

Fixture drain means the pipe that connects a *trap* serving a *fixture* to another part of a *drainage system*.

Fixture outlet pipe means a pipe that connects the waste opening of a *fixture* to the *trap* serving the *fixture*.

Fixture unit means, when applied to a *drainage system*, the unit of measure based on the rate of discharge, time of operation and frequency of use of a *fixture* that expresses the hydraulic load that is imposed by that *fixture* on the *drainage system*.

Fixture unit means, when applied to a *water distribution system*, the unit of measure based on the rate of supply, time of operation and frequency of use of a *fixture* or outlet that expresses the hydraulic load that is imposed by that *fixture* or outlet on the supply system.

Flame-spread rating means an index or classification indicating the extent of the spread of flame on the surface of a material or an assembly of materials, as determined in a standard fire test prescribed in this Code.

Flash point means the minimum temperature at which a liquid within a container gives off vapour in sufficient concentration to form an ignitable mixture with air near the surface of the liquid.

Flood level rim means the top edge at which water can overflow from a *fixture* or device.

Floor area means the space on any *storey* of a *building* between exterior walls and required *firewalls*, including the space occupied by interior walls and *partitions*, but not including *exits*, *vertical service spaces* and their enclosing assemblies.

Flow control roof drain means a *roof drain* that restricts the flow of *storm water* into the *storm drainage system*.

Flue means an enclosed passageway for conveying *flue* gases.

Flue collar means the portion of a fuel-fired *appliance* designed for the attachment of the *flue pipe* or *breeching*.

Flue pipe means the pipe connecting the *flue collar* of an *appliance* to a *chimney*.

Food premises means a *floor area* where food or drink for human consumption, or an ingredient of food or drink for human consumption, is manufactured, processed, prepared, stored, displayed, handled, served, distributed, sold or offered for sale, but does not include,

(a) a private residence,

(b) a boarding house that provides meals for fewer than ten boarders,

(c) a *building* to which Regulation 554 of the Revised Regulations of Ontario, 1990 (Camps in Unorganized Territory) or 568 of the Revised Regulations of Ontario, 1990 (Recreational Camps) made under the *Health Protection and Promotion Act* applies,

(d) a plant, as defined in the *Milk Act*, that is required to be operated under the authority of a licence issued under that Act;

(e) premises where a licensed activity, as defined in the *Food Safety and Quality Act, 2001*, is carried on by a person who is required to hold a licence issued under that Act,

(f) an egg-grading station or a processed egg station that is required to be operated under the authority of a licence issued under the *Livestock and Livestock Products Act*,

(g) a *floor area* occupied by a church, service club or fraternal organization for the purpose of,

  (i) preparing meals for special events for its members and personally invited guests, or

  (ii) conducting bake sales, or

(h) a *farm building*.

Forced-air furnace means a *furnace* equipped with a fan that provides the primary means for the circulation of air.

Force main means a *sanitary drainage pipe* through which *sanitary sewage* is conveyed by mechanical or pneumatic propulsion.

Foundation means a system or arrangement of *foundation units* through which the loads from a *building* are transferred to supporting *soil* or *rock*.

Foundation unit means one of the structural members of the *foundation* of a *building*, such as a footing, raft and *pile*.

Fresh air inlet means a *vent pipe* that is installed in conjunction with a *building trap* and terminates in *open air*.

Frost action means the phenomenon that occurs when,

(a) water in *soil* is subjected to freezing which, because of the water ice phase change or ice lens growth, results in a total volume increase or the build-up of expansive forces under confined conditions or both, and

(b) the subsequent thawing leads to loss of *soil* strength and increased compressibility.

Functional statement means a function set out in Table 3.2.1.1. that a *building* or an element of a *building* is intended to perform.

Furnace means a *space-heating appliance* that uses warm air as the heating medium and usually provides for the attachment of ducts.

Gaming premises means gaming premises as defined in the *Ontario Lottery and Gaming Corporation Act, 1999.*

Gas vent means that portion of a venting system designed to convey vent gases to the outdoors,

(a) from the *vent connector* of a gas-fired *appliance*, or

(b) directly from the *appliance* when a *vent connector* is not used.

Grade means the average level of proposed or finished ground adjoining a *building* at all exterior walls.

Graded lumber means lumber that has been graded and stamped to indicate its grade, as determined by the NLGA "Standard Grading Rules for Canadian Lumber".

Greywater means *sanitary sewage* of domestic origin that is derived from *fixtures* other than *sanitary units*.

Gross area means the total area of all floors above *grade* measured between the outside surfaces of exterior walls or between the outside surfaces of exterior walls and the centre line of *firewalls*, except that, in any other *occupancy* than a *residential occupancy*, where an access or a *building* service penetrates a *firewall*, measurements shall not be taken to the centre line of such *firewall*.

Ground water means, when applied to a *sewage system*, water below the surface of the ground that occupies a zone of the earth's mantle that is saturated with water.

Ground water table means, when applied to a *sewage system*, the elevation of the upper surface of the *ground water* existing in the area of the *sewage system*.

Groundwater means a free standing body of water in the ground.

Groundwater level means the top surface of *groundwater*.

Guard means a protective barrier, with or without openings through it, that is around openings in floors or at the open sides of stairs, landings, balconies, *mezzanines*, galleries, raised *walkways* or other locations to prevent accidental falls from one level to another.

Hauled sewage means *sanitary sewage* that,

(a) is not finally disposed of at the site where it is produced and is not conveyed by a sewer to *sewage works*, and

(b) is stored or retained at the site where it is produced for periodic collection, handling, treatment, transportation, storage or processing prior to final disposal at a place other than where it was produced,

and includes *sanitary sewage* that is removed from a *sewage system* for the purpose of cleaning or maintaining the system.

Hauled sewage system means works, installations, equipment, operations and land used in connection with the collection, handling, treatment, transportation, storage, processing and disposal of *hauled sewage*, as regulated under the *Environmental Protection Act*.

Hazard index means a level on a scale of 1 to 8 determined in accordance with Tables 11.2.1.1.B. to 11.2.1.1.N. of Division B, designating the life safety hazard to occupants of a *building* based on,

(a) use and *occupancy*,

(b) *occupant load*,

(c) the use and function of floor spaces,

(d) the difficulty of egress,

(e) the fire load of contents, finishes and furnishings,

(f) the configuration or compartmentation of floor spaces, and

(g) the size of the *building*,

and "*H.I.*" has a corresponding meaning.

Hazardous classroom means a classroom,

(a) that is supplied with flammable gas,

(b) that contains hazardous substances such as chemicals or explosive dusts,

(c) that contains large quantities of *combustible* materials, or

(d) where cooking equipment is used.

Hazardous room means a room containing sufficient quantities of a substance that, because of its chemical nature, may create an atmosphere or condition of imminent hazard to health.

Header means a *vent pipe* that connects two or more *vent stacks* or *stack vents* to *open air*.

Header line means a line of pipe with watertight joints installed in a *sewage system* for the purpose of distributing *effluent* from a *treatment unit* to the *distribution pipe* in a *leaching bed*.

Heat detector means a *fire detector* designed to operate at a predetermined temperature or rate of temperature rise.

Heavy timber construction means that type of *combustible construction* in which a degree of fire safety is attained,

(a) by placing limitations on the sizes of wood structural members and on the thickness and composition of wood floors and roofs, and

(b) by the avoidance of concealed spaces under floors and roofs.

Heritage building means a *building*,

(a) that is designated under the *Ontario Heritage Act*, or

(b) that is certified to be of significant architectural or historical value by a recognized, non-profit public organization whose primary object is the preservation of structures of architectural or historical significance and the certification has been accepted by the *chief building official*.

High ground water table means the highest elevation at which there is physical evidence that the *soil*, as defined in Part 8 of Division B, or the *leaching bed fill* has been saturated with water.

High hazard industrial occupancy (Group F, Division 1) means an *industrial occupancy* containing sufficient quantities of highly *combustible* and flammable or explosive materials to constitute a special fire hazard because of their inherent characteristics.

Holding tank means a tank designed to totally retain all *sanitary sewage* discharged into it and requiring periodic emptying.

Home for special care means a home for the care of persons requiring nursing, residential or sheltered care.

Horizontal branch means that part of a *waste pipe* that is horizontal and installed to convey the discharge from more than one *fixture*.

Horizontal exit means an *exit* from one *building* to another by means of a doorway, vestibule, *walkway*, bridge or balcony.

Horizontal service space means a space such as an attic, duct, ceiling, roof or crawl space,

(a) that is oriented essentially in a horizontal plane,

(b) that is concealed and generally inaccessible, and

(c) through which *building* service facilities such as pipes, ducts and wiring may pass.

Hotel means *floor areas*, a *floor area* or part of a *floor area* that contains four or more *suites* and that provides sleeping accommodation for the travelling public or for recreational purposes.

Hub drain means a drain opening for indirect liquid wastes,

(a) that does not serve as a floor drain,

(b) that has the same pipe *size*, material and venting requirements as a floor drain,

(c) that has a *flood level rim* above the floor in which it is installed, and

(d) that receives wastes that are discharged directly into the drain opening.

Impeded egress zone means a supervised area in which occupants have free movement but require the release, by security personnel, of security doors at the boundary before being able to leave the area, but does not include a *contained use area*.

Indirect service water heater means a *service water heater* that derives its heat from a heating medium such as warm air, steam or hot water.

Indirectly connected means not *directly connected*.

Indoor pool means a *public pool* where the pool and *pool deck* are totally or partially covered by a roof.

Industrial occupancy means the *occupancy* or use of a *building* or part of a *building* for the assembling, fabricating, manufacturing, processing, repairing or storing of goods or materials.

Interceptor means a receptacle that is designed and installed to prevent oil, grease, sand or other materials from passing into a *drainage system*.

Interconnected floor space means superimposed *floor areas* or parts of *floor areas* in which floor assemblies that are required to be *fire separations* are penetrated by openings that are not provided with *closures*.

Leaching means dispersal of liquid by downward or lateral drainage or both into permeable *soil*, as defined in Part 8 of Division B, or *leaching bed fill*.

Leaching bed means an absorption system constructed as *absorption trenches* or as a filter bed, located wholly in ground or raised or partly raised above ground, as required by local conditions, to which *effluent* from a *treatment unit* is applied for treatment and disposal and that is composed of,

(a) the *soil*, as defined in Part 8 of Division B, *leaching bed fill* or other filter media that is contained between the surface on which the *sanitary sewage* is applied and the bottom of the bed,

(b) the *distribution pipe* and the stone or gravel layer in which the *distribution pipe* is located, and

(c) the backfill above the *distribution pipe*, including the topsoil and sodding or other anti-erosion measure, and the side slopes of any portion elevated above the natural ground elevation.

Leaching bed fill means unconsolidated material suitable for the *construction* of a *leaching bed*, placed in the area of the *leaching bed* in order to obtain the required unsaturated zone below the *distribution pipes* and the required lateral extent such that the *effluent* is absorbed.

Leader means a pipe that is installed to carry storm water from a roof to a *storm building drain*, sewer or other place of disposal.

Limiting distance means the distance from an *exposing building face* to a property line, to the centre line of a *street*, lane or public thoroughfare or to an imaginary line between two *buildings* or *fire compartments* on the same property, measured at right angles to the *exposing building face*.

Listed means equipment or materials included in a list published by a certification organization accredited by the Standards Council of Canada.

Live load means a variable load due to the intended use and *occupancy* that is to be assumed in the design of the structural members of a *building* and includes loads due to cranes and the pressure of liquids in containers.

Live/work unit means a *dwelling unit* that contains a subsidiary *business and personal services occupancy* or a subsidiary *low hazard industrial occupancy*, has an area of not more than 150 m^2, and is used and operated by one or more persons of a single household.

Loadbearing means, when applied to a *building* element, subjected to or designed to carry loads in addition to its own *dead load*, but does not include a wall element subject only to wind or earthquake loads in addition to its own *dead load*.

Loading rate means the volume in litres of *effluent* per square metre applied in a single day to *soil*, as defined in Part 8 of Division B, or *leaching bed fill*.

Low hazard industrial occupancy (Group F, Division 3) means an *industrial occupancy* in which the *combustible* content is not more than 50 kg/m^2 or 1200 MJ/m^2 of *floor area*.

Low human occupancy means, when applied to a *farm building*, an *occupancy* in which the *occupant load* of not more than one person per 40 m^2 of *floor area* during normal use.

Major occupancy means the principal *occupancy* for which a *building* or part of a *building* is used or intended to be used, and is deemed to include the subsidiary *occupancies* that are an integral part of the principal *occupancy*.

Make-up water means water added to a *public pool* from an external source.

Marquee means a *canopy* over an entrance to a *building*.

Masonry or concrete chimney means a *chimney* of brick, stone, concrete or masonry units constructed on site.

Means of egress includes *exits* and *access to exits* and means a continuous path of travel provided for the escape of persons from any point in a *building* or in a contained open space to,

(a) a separate *building*,

(b) an open public thoroughfare, or

(c) an exterior open space that is protected from fire exposure from the *building* and that has access to an open public thoroughfare.

Medium hazard industrial occupancy (Group F, Division 2) means an *industrial occupancy* in which the *combustible* content is more than 50 kg/m^2 or 1200 MJ/m^2 of *floor area* and that is not classified as a *high hazard industrial occupancy*.

Mercantile occupancy means the *occupancy* or use of a *building* or part of a *building* for the displaying or selling of retail goods, wares or merchandise.

Mezzanine means an intermediate floor assembly between the floor and ceiling of any room or *storey* and includes an interior balcony.

Modified pool means a *public pool* that has a basin-shaped floor sloping downward and inward toward the interior from the rim.

Modified stack venting means a *stack venting* arrangement in which the *stack vent* above the connection of the highest *stack vented fixture* is reduced in diameter.

Municipal drinking-water system has the same meaning as in subsection 2 (1) of the *Safe Drinking Water Act, 2002*.

Nominally horizontal means at an angle of less than 45° with the horizontal.

Nominally vertical means at an angle of not more than 45° with the vertical.

Noncombustible means that a material meets the acceptance criteria of CAN4-S114, "Standard Method of Test for Determination of Non-Combustibility in Building Materials".

Noncombustible construction means a type of construction in which a degree of fire safety is attained by the use of *noncombustible* materials for structural members and other building assemblies.

Objective means an objective set out in Article 2.2.1.1.

Occupancy means the use or intended use of a *building* or part of a *building* for the shelter or support of persons, animals or property.

Occupant load means the number of persons for which a *building* or part of a *building* is designed.

Offset means the piping that connects the ends of two pipes that are parallel.

Offset relief vent means a *relief vent* that provides additional air circulation upstream and downstream of an *offset* in a *soil* or *waste stack*.

Open air means the atmosphere outside a *building*.

Open-air storey means a *storey* in which at least 25 per cent of the total area of its perimeter walls is open to the outdoors in a manner that will provide cross ventilation to the entire *storey*.

Outdoor pool means a *public pool* that is not an *indoor pool*.

Pail privy means a latrine in which the receptacle for human waste consists of a removable container surmounted by a superstructure.

Partition means an interior wall, one *storey* or part-*storey* in height, that is not *loadbearing*.

Party wall means a wall,

(a) that is jointly owned and jointly used by two parties under an easement agreement or by a right in law, and

(b) that is erected at or upon a line separating two parcels of land each of which is, or is capable of being a separate real estate entity.

Perched groundwater means a free standing body of water in the ground extending to a limited depth.

Percolation time means the average time in minutes that is required for water to drop one centimetre during a percolation test or as determined by a *soil* evaluation or analysis.

Performance level means the level of performance under which all or part of an existing *building* functions with respect to its *building systems*.

Pharmacy means the premises in a *building* or the part of the premises in which prescriptions are compounded and dispensed for the public or in which drugs are sold by retail.

Pile means a slender *deep foundation unit*,

(a) that is made of materials such as wood, steel or concrete or a combination of them, and

(b) that is either pre-manufactured and placed by driving, jacking, jetting or screwing, or cast-in-place in a hole formed by driving, excavating or boring.

Plenum means a chamber forming part of an air duct system.

Plumbing appliance means a receptacle or equipment that receives or collects water, liquids or *sewage* and discharges water, liquid or *sewage* directly or indirectly to a *plumbing system*.

Plumbing system means a system of connected piping, fittings, valves, equipment, *fixtures* and appurtenances contained in *plumbing*.

Point of entry treatment unit has the same meaning as in Subsection 1 (1) of Ontario Regulation 170/03 (Drinking-Water Systems) made under the *Safe Drinking Water Act, 2002*.

Pool deck means the area immediately surrounding a *public pool*.

Portable privy means a portable latrine in which the receptacle for human body waste and the superstructure are combined structurally into one unit.

Post-disaster building means a *building* that is essential to the provision of services in the event of a disaster, and includes,

(a) hospitals, emergency treatment facilities and blood banks,

(b) telephone exchanges,

(c) power generating stations and electrical substations,

(d) control centres for land transportation,

(e) public water treatment and storage facilities,

(f) water and sewage pumping stations,

(g) emergency response facilities,

(h) fire, rescue and police stations,

(i) storage facilities for vehicles or boats used for fire, rescue and police purposes, and

(j) communications facilities, including radio and television stations.

Potable means fit for human consumption.

Potable water system means the *plumbing* that conveys *potable* water.

Pressurized distribution system means a *leaching bed* in which the *effluent* is distributed through the use of pressurized *distribution pipes*.

Private sewage disposal system means a *sewage system* or a *sewage works* that is not owned and operated by the Crown, a municipality or an organization acceptable to the Director responsible for issuing a Certificate of Approval under the *Ontario Water Resources Act*.

Private sewer means a sewer other than a *building sewer* that,

(a) is not owned or operated by a municipality, the Ministry of Environment or another public agency,

(b) receives drainage from more than one *sanitary building drain* either directly or through more than one *sanitary building sewer* or receives drainage from more than one *storm building drain* either directly or through one or more *storm building sewers*, and connects to a main sewer, or

(c) serves as a place of disposal on the property,

but does not include,

(d) a sewer that carries only the sanitary waste or *storm sewage* from two semi-detached dwelling units,

(e) a sewer that carries only the sanitary waste or *storm sewage* from one main *building* that is of *industrial*, commercial or *care or detention occupancy* and one ancillary *building*, or

(f) a sewer that carries only the sanitary waste or *storm sewage* from a row housing complex having five or fewer single family residences.

Private water supply means piping that serves as a source of supply on the property to more than one *water service pipe*.

Private water supply system means an assembly of pipes, fittings, valves, equipment and appurtenances that supplies water from a private source to a *potable water system*.

Privy vault means a latrine in which the receptacle for human waste consists of a constructed vault from which the waste is periodically removed.

Professional engineer means, for the purposes of the Act and this Code, a person who holds a licence or a temporary licence under the *Professional Engineers Act*.

Public corridor means a corridor that provides *access to exit* from more than one *suite*.

Public heritage building means a *heritage building* where the *occupancy* in whole or in part includes viewing of the *building* by the public provided that displays in it are limited to those relevant to the heritage significance of the *building*.

Public pool means a structure, basin, chamber or tank containing or intended to contain an artificial body of water for swimming, water sport, water recreation or entertainment, but does not include,

(a) pools operated in conjunction with less than six *dwelling units*, *suites* or single family residences or any combination of them,

(b) pools that are used only for commercial display and demonstration purposes,

(c) wading pools,

(d) hydro-massage pools, or

(e) pools that serve only as receiving basins for persons at the bottom of water slides.

Public spa means a hydro-massage pool that contains an artificial body of water, that is intended primarily for therapeutic or recreational use, that is not drained, cleaned or refilled before use by each individual and that utilizes hydrojet circulation, air induction bubbles, current flow or a combination of them over the majority of the pool area, but does not include,

(a) wading pools, or

(b) spas operated in conjunction with less than six *dwelling units*, *suites* or single family residences, or any combination of them, for the use of occupants or residents and their visitors.

Public use means, when applied to plumbing *fixtures*, *fixtures* in general washrooms of schools, gymnasiums, hotels, bars, public comfort stations and other installations in which *fixtures* are installed so that their use is unrestricted.

Public way means a sidewalk, *street*, highway, square or another open space to which the public has access, as of right or by invitation, expressed or implied.

Range means a cooking *appliance* equipped with a cooking surface and one or more ovens.

Recirculation system means a system,

(a) that maintains the circulation of water through a *public pool* by pumps, and

(b) that provides continuous treatment of the water, including filtration and chlorination or bromination and any other process that may be necessary for the treatment of the water.

Recreational camp means a camp for recreational activities consisting of one or more *buildings* or other structures established or maintained as living quarters, with or without charge, for the temporary *occupancy* of 10 or more persons for five or more days.

Relief vent means a *vent pipe* that is used in conjunction with a *circuit vent* to provide additional air circulation between a *drainage system* and a *venting system*.

Repair garage means a *building* or part of a *building* where facilities are provided for the repair or servicing of motor vehicles.

Residential occupancy means the *occupancy* or use of a *building* or part of a *building* by persons for whom sleeping accommodation is provided but who are not harboured or detained there to receive medical care or treatment or who are not involuntarily detained there.

Return duct means a duct for conveying air from a space being heated, ventilated or air-conditioned back to the heating, ventilating or *air-conditioning appliance*.

Riser means a water *distributing pipe* that extends through at least one full *storey*, as defined in Part 7 of Division B.

Rock means a portion of the earth's crust that is consolidated, coherent and relatively hard and that is a naturally formed, solidly bonded, mass of mineral matter that cannot readily be broken by hand.

Roof drain means a fitting or device that is installed in the roof to permit *storm sewage* to discharge into a *leader*.

Roof gutter means an exterior channel installed at the base of a sloped roof to convey *storm sewage*.

Sanitary building drain means a *building drain* that conducts *sewage* to a *building sewer* from the most upstream *soil* or *waste stack*, *branch* or *fixture drain* serving a water closet.

Sanitary building sewer means a pipe that is connected to a *sanitary building drain* 1 000 mm outside a wall of a *building* and that conducts *sewage* to a public sewer or *private sewage disposal system*.

Sanitary drainage pipe means all piping that conveys *sanitary sewage* to a place of disposal, including the *sanitary building drain*, *sanitary building sewer*, *soil pipe*, *soil stack*, *waste stack* and *waste pipe* but not the main sewer or piping in a *sewage* treatment plant.

Sanitary drainage system means a *drainage system* that conducts *sanitary sewage*.

Sanitary sewage means liquid or water borne waste,

(a) of industrial or commercial origin, or

(b) of domestic origin, including human body waste, toilet or other bathroom waste, and shower, tub, culinary, sink and laundry waste.

Sanitary sewer means a sewer that conducts *sewage*.

Sanitary unit means a water closet, urinal, bidet or bedpan washer.

Self-service storage building means a *building* that is used to provide individual storage spaces to the public and that is open to the public only for those purposes.

Septic tank means a watertight vault in which *sanitary sewage* is collected for the purpose of removing scum, grease and solids from the liquid without the addition of air and in which solids settling and anaerobic digestion of the *sanitary sewage* takes place.

Service room means a room provided in a *building* to contain equipment associated with *building* services.

Service space means space provided in a *building* to facilitate or conceal the installation of building service facilities such as chutes, ducts, pipes, shafts or wires.

Service water heater means a device for heating water for *plumbing* services.

Sewage means *sanitary sewage* or *storm sewage*.

Sewage system means,

(a) a chemical toilet, an incinerating toilet, a recirculating toilet, a self-contained portable toilet and all forms of privy including a *portable privy*, an *earth pit privy*, a *pail privy*, a *privy vault* and a composting toilet system,

(b) a *greywater* system,

(c) a cesspool,

(d) a *leaching bed* system, or

(e) a system that requires or uses a *holding tank* for the retention of *hauled sewage* at the site where it is produced before its collection by a *hauled sewage system*,

where these,

(f) have a *design capacity* of 10,000 litres per day or less,

(g) have, in total, a *design capacity* of 10,000 litres per day or less, where more than one of these are located on a lot or parcel of land, and

(h) are located wholly within the boundaries of the lot or parcel of land on which is located the *building* or *buildings* they serve.

Sewage works means sewage works as defined in subsection 1 (1) of the *Ontario Water Resources Act*.

Shallow buried trench means an *absorption trench* that contains a *chamber*.

Shallow foundation means a *foundation unit* that derives its support from *soil* or *rock* located close to the lowest part of the *building* that it supports.

Shelf and rack storage system means a self-contained structural system within a *building*, having one or more elevated platforms or walkway levels for personnel access that may also support conveyors and other material handling, storage and distribution equipment.

Size means the nominal diameter by which a pipe, fitting, *trap* or other similar item is commercially designated.

Smoke alarm means a combined *smoke detector* and audible alarm device designed to sound an alarm within the room or *suite* in which it is located on the detection of smoke within that room or *suite*.

Smoke detector means a *fire detector* designed to operate when the concentration of airborne combustion products exceeds a pre-determined level.

Soil means, except for the purposes of Part 8 of Division B, a portion of the earth's crust that is fragmentary or such that individual particles of a dried sample may be readily separated by agitation in water, and includes boulders, cobbles, gravel, sand, silt, clay and organic matter.

Soil pipe means a *sanitary drainage pipe* that carries the discharge of a *sanitary unit*, with or without the discharge, from any other *fixture*.

Soil stack means a vertical *soil pipe* that passes through one or more *storeys* and includes any *offset* that is part of the stack.

Space heater means a *space-heating appliance* for heating the room or space within which it is located, without the use of ducts.

Space-heating appliance means an *appliance*,

(a) that is intended to supply heat directly to a room or space, such as a *space heater*, fireplace and *unit heater*, or

(b) that is intended to supply heat to rooms or spaces of a *building* through a heating system, such as a central *furnace* or *boiler*.

Sprinklered means equipped with a system of automatic sprinklers.

Stack vent means a *vent pipe* that connects the top of a *soil stack* or *waste stack* to a *header* or *open air* and "*stack vented*" has a corresponding meaning.

Stack venting means, when used with reference to *fixtures*, an arrangement such that the connections of the drainage piping from the *stack vented fixtures* to the stack provide venting to the *fixture traps* so that no additional *vent pipe* is required.

Stage means a space that is designed primarily for theatrical performances with provision for quick change scenery and overhead lighting, including environmental control for a wide range of lighting and sound effects, and that is traditionally, but not necessarily, separated from the audience by a proscenium wall and curtain opening.

Starting platform means a rigid platform located entirely on a *pool deck* that consists of a top that, if projected horizontally over the water surface, would be less than 1 000 mm (3 ft 3 in) in vertical height above the surface and that is designed to be used by a swimmer to dive from at the start of a swimming race.

Storage garage means a *building* or part of a *building* that is intended for the storage or parking of motor vehicles and that contains no provision for the repair or servicing of motor vehicles.

Storage-type service water heater means a *service water heater* with an integral hot water storage tank.

Storey means, except for the purposes of Part 7 of Division B, the portion of a *building*,

(a) that is situated between the top of any floor and the top of the floor next above it, or

(b) that is situated between the top of the floor and the ceiling above the floor, if there is no floor above it.

Storm building drain means a *building drain* that conducts storm water and is connected at its upstream end to a leader, sump or catch basin, and at its downstream end to a *building sewer* or a designated storm water disposal location.

Storm building sewer means a building sewer that conveys *storm sewage* to a place of disposal and commences 1 000 mm from the *building*.

Storm drainage pipe means all the connected piping that conveys *storm sewage* to a place of disposal and includes the *storm building drain*, *storm building sewer*, rain water *leader*, catch basin and area drain installed to collect water from the property and the piping that drains water from a swimming pool or from water cooled *air-conditioning* equipment, but does not include,

(a) a main *storm sewer*,

(b) a *subsoil drainage pipe*, or

(c) a private sewage treatment and disposal facility designed for the treatment or retention of *storm sewage* prior to discharge to the natural environment.

Storm drainage system means a *drainage system* that conveys *storm sewage*.

Storm sewage means water that is discharged from a surface as a result of rainfall, snow melt or snowfall.

Storm sewer means a sewer that conveys *storm sewage*.

Stove means an *appliance* intended for cooking or space heating or both.

Street means any highway, road, boulevard, square or other improved thoroughfare that is 9 m or more in width, that has been dedicated or deeded for public use and that is accessible to fire department vehicles and equipment.

Subsoil drainage pipe means a pipe that is installed underground to intercept and convey subsurface water, and includes foundation drain pipes.

Subsurface investigation means the appraisal of the general subsurface conditions at a *building* site by analysis of information gained by methods such as geological surveys, in situ testing, sampling, visual inspection, laboratory testing of samples of the subsurface materials and *groundwater* observations and measurements.

Suite means a single room or series of rooms of complementary use, operated under a single tenancy, and includes,

(a) *dwelling units*,

(b) individual guest rooms in motels, hotels, boarding houses, rooming houses and dormitories, and

(c) individual stores and individual or complementary rooms for *business and personal services occupancies*.

Supply duct means a duct for conveying air from a heating, ventilating or *air-conditioning appliance* to a space to be heated, ventilated or air-conditioned.

Surface water means water on the surface of the ground.

Theatre means a place of public assembly intended for the production and viewing of the performing arts or the screening and viewing of motion pictures, and consisting of an auditorium with permanently fixed seats intended solely for a viewing audience.

Trap means a fitting or device that is designed to hold a liquid seal that will prevent the passage of gas but will not materially affect the flow of a liquid.

Trap arm means that portion of a *fixture drain* between the *trap weir* and the *vent pipe* fitting.

Trap dip means the lowest part of the upper interior surface of a *trap*.

Trap seal depth means the vertical distance between the *trap dip* and the *trap weir*.

Trap standard means the *trap* for a *fixture* that is integral with the support for the *fixture*.

Trap weir means the highest part of the lower interior surface of a *trap*.

Treatment unit means a device that, when designed, installed and operated in accordance with its design specifications, provides a specific degree of *sanitary sewage* treatment to reduce the contaminant load from that of *sanitary sewage* to a given *effluent* quality.

Tribunal means the License Appeal Tribunal established under the *Licence Appeal Tribunal Act, 1999*.

Unit heater means a suspended *space heater* with an integral air circulating fan.

Unprotected opening means, when applied to an *exposing building face*,

(a) a doorway, window or opening, other than one equipped with a *closure* having the required *fire-protection rating*, or

(b) any part of a wall forming part of the *exposing building face* that has a *fire-resistance rating* less than required for the *exposing building face*.

Vacuum breaker means *back-siphonage preventer*.

Vapour barrier means the elements installed to control the diffusion of water vapour.

Vent connector means, when applied to a heating or cooling system, the part of a venting system that conducts the *flue* gases or vent gases from the *flue collar* of a gas *appliance* to the *chimney* or *gas vent*, and may include a draft control device.

Vent pipe means a pipe that is part of a *venting system*.

Vent stack means a *vent pipe* that is connected at its upper end to a *header* or is terminated in *open air* and that is used to limit pressure differential in a *soil* or *waste stack*.

Venting system means an assembly of pipes and fittings that connects a *drainage system* with *open air* for circulation of air and the protection of *trap* seals in the *drainage system*.

Vertical leg means the vertical portion of a *fixture* drain and includes the portion of a drain from the outlet of a water closet bowl to the point where the connecting piping changes to horizontal.

Vertical service space means a shaft that is oriented essentially vertically and that is provided in a *building* to facilitate the installation of *building* services, including mechanical, electrical and plumbing installations and facilities such as elevators, refuse chutes and linen chutes.

Walkway means a covered or roofed pedestrian thoroughfare used to connect two or more *buildings*.

Waste pipe means a *sanitary drainage pipe* that carries the discharge from a *fixture* directly to a *waste stack, soil stack, sanitary building drain, branch* or *sewage system*.

Waste stack means a vertical *waste pipe* that passes through one or more *storeys* and includes any offset that is part of the stack that conducts liquid waste from *fixtures* other than *sanitary units*.

Water distribution system means an assembly of pipes, fittings, valves and appurtenances that conveys *potable water* to water supply outlets, *fixtures, plumbing appliances* and devices from the *water service pipe* or from a *point of entry treatment unit* located in the *building*.

Water purveyor means the owner or operator of a *drinking-water system*.

Water service pipe means a pipe on the property that conveys *potable* water from a *drinking-water system* or a *private water supply* to the inside of the *building*.

Water system means a *water service pipe*, a *private water supply*, a *water distribution system*, a *fire service main* or any part of any of them.

Wave action pool means a *public pool* equipped with a means for inducing wave motion in the water.

Wet vent means a *waste pipe* that also serves as a *vent pipe*.

Working capacity means the volume of liquid that a *treatment unit* or *holding tank* is capable of holding without overflowing while it is in its working position, but does not include the volume of liquid contained in a compartment in which a pump or siphon is installed.

X-ray equipment includes x-ray imaging systems, processing equipment and equipment directly related to the production of images for diagnosis or directly related to irradiation with x-rays for therapy.

X-ray machine means an electrically-powered device producing x-rays for the irradiation of a human being or an animal for a therapeutic or diagnostic purpose or for industrial use.

Yoke vent means a *vent pipe* that is connected at its lower end to a *soil* or *waste stack* and at its upper end to a *vent stack* or a *branch vent* that is connected to a *vent stack*.

1.4.1.3. Definition of Applicable Law

(1) For the purposes of section 8 of the Act, *applicable law* means,

(a) the statutory requirements in the following provisions with respect to the following matters:

(i) section 5 of the *Charitable Institutions Act*, with respect to the approval by the Minister of the site and plans for a new *building* or an addition to an existing *building* used or to be used as a charitable institution,

(ii) section 5 of Regulation 262 of the Revised Regulations of Ontario, 1990 (General) made under the *Day Nurseries Act* with respect to the approval of plans for a new *building* to be erected or an existing *building* to be used, altered or renovated for use as a day nursery or for alterations or renovations to be made to premises used by a day nursery,

(iii) section 194 of the *Education Act*, with respect to the approval of the Minister for the *demolition* of a *building*,

(iv) section 6 of Regulation 314 of the Revised Regulations of Ontario, 1990 (General) made under the *Elderly Persons Centres Act* with respect to the approval of the Minister for the *construction* of a *building* project,

(v) section 5 of the *Environmental Assessment Act* with respect to the approval of the Minister or the Environmental Review Tribunal to proceed with an undertaking,

(vi) section 46 of the *Environmental Protection Act* with respect to the approval of the Minister to use land or land covered by water that has been used for the disposal of waste,

(vii) section 168.3.1 of the *Environmental Protection Act* with respect to the *construction* of a *building* to be used in connection with a change of use of a property,

(viii) paragraph 2 of subsection 168.6 (1) of the *Environmental Protection Act* if a certificate of property use has been issued in respect of the property under subsection 168.6 (1) of that Act,

(ix) section 9 of Regulation 469 of the Revised Regulations of Ontario, 1990 (Equipment and Premises), made under the *Funeral Directors and Establishments Act*, with respect to the provision to the Registrar of architectural plans or drawings of the proposed *construction* or alteration of a funeral establishment,

(x) section 14 of the *Homes for the Aged and Rest Homes Act* with respect to the approval of the Minister for the erection or alteration of a *building* for use as a home or a joint home,

(xi) section 14 of the *Milk Act* with respect to the permit from the Director for the *construction* or alteration of any *building* intended for use as a plant,

(xii) section 4 of Regulation 832 of the Revised Regulations of Ontario, 1990 (General) made under the *Nursing Homes Act* with respect to the provision to the Director of plans and specifications and such information and other material as may be required by the Director in respect of the *construction*, alteration, addition to or renovation of a nursing home or conversion of an existing *building* into a nursing home,

(xiii) section 11.1 of Ontario Regulation 267/03 (General) made under the *Nutrient Management Act, 2002* with respect to a proposed *building* or structure to house farm animals or store nutrients if that regulation requires the preparation and approval of a nutrient management strategy before *construction* of the proposed *building* or structure,

(xiv) subsection 30 (2) of the *Ontario Heritage Act* with respect to the consent of the council of a municipality for the alteration or *demolition* of a *building*,

(xv) section 33 of the *Ontario Heritage Act* with respect to the consent of the council of a municipality for the alteration of property,

(xvi) section 34 of the *Ontario Heritage Act* with respect to the consent of the council of a municipality for the demolition of a *building*,

(xvii) section 34.5 of the *Ontario Heritage Act* with respect to the consent of the Minister to the alteration or *demolition* of a designated *building*,

(xviii) subsection 34.7 (2) of the *Ontario Heritage Act* with respect to the consent of the Minister to the alteration or *demolition* of a designated *building*,

(xix) section 42 of the *Ontario Heritage Act* with respect to the permit given by the council of a municipality for the erection, alteration or *demolition* of a *building*,

(xx) section 14 of the *Ontario Planning and Development Act, 1994* with respect to any conflict between a development plan made under that Act and a zoning by-law that affects the proposed *building* or structure,

(xxi) section 41 of the *Planning Act* with respect to the approval by the council of the municipality or the Municipal Board of plans and drawings,

(xxii) section 2 of Ontario Regulation 453/96 (Work Permit — Construction) made under the *Public Lands Act* with respect to the work permit authorizing the *construction* or placement of a *building* on public land,

(xxiii) section 34 or 38 of the *Public Transportation and Highway Improvement Act* with respect to the permit from the Minister for the placement, erection or alteration of any *building* or other structure or the use of land,

(b) the following provisions of Acts and regulations:

(i) sections 28 and 53 of the *Development Charges Act, 1997*,

(ii) sections 257.83 and 257.93 of the *Education Act*,

(iii) subsection 5 (4) of the *Environmental Assessment Act*,

(iv) subsection 133 (4) of the *Municipal Act, 2001*,

(v) subsection 24 (3) of the *Niagara Escarpment Planning and Development Act*,

(vi) subsections 4 (3) and (5) of Regulation 832 of the Revised Regulations of Ontario, 1990 (General) made under the *Nursing Homes Act*,

(vii) section 46 of the *Planning Act*,

(viii) section 33 of the *Planning Act* except where, in the case of the *demolition* of a residential property, a permit to *demolish* the property is obtained under that section,

(ix) subsection 22 (1) of the *Private Hospitals Act*,

(c) regulations made by a conservation authority under clause 28 (1) (c) of the *Conservation Authorities Act* with respect to permission of the authority for the *construction* of a *building* or structure if, in the opinion of the authority, the control of flooding, erosion, dynamic beaches or pollution or the conservation of land may be affected by the development,

(d) by-laws made under section 40.1 of the *Ontario Heritage Act*,

(e) by-laws made under section 34 or 38 of the *Planning Act* or under section 3 of Ontario Regulation 246/01 (Development Permits) made under that Act,

(f) orders made by the Minister under section 47 of the *Planning Act* or subsection 17 (1) of the *Ontario Planning and Development Act, 1994*, and

(g) by-laws made under any private Act that prohibit the proposed *construction* or *demolition* of the *building* unless the by-law is complied with.

(2) For the purposes of clause 10 (2) (a) of the Act, *applicable law* means any general or special Act, and all regulations and by-laws enacted under them that prohibit the proposed use of the *building* unless the Act, regulation or by-law is complied with.

1.4.2. Symbols and Other Abbreviations

1.4.2.1. Symbols and Other Abbreviations

(1) In this Code, a symbol or abbreviation listed in Column 1 of Table 1.4.2.1. shall have the meaning listed opposite it in Column 2.

Table 1.4.2.1.
Symbols and Abbreviations

Forming Part of Sentence 1.4.2.1.(1)

COLUMN 1	COLUMN 2	COLUMN 3
Item	Symbol or Abbreviation	Meaning
1.	1 in 2	slope of 1 vertical to 2 horizontal
2.	ABS	acrylonitrile-butadiene-styrene
3.	BOD	the five day biochemical oxygen demand
4.	CBOD	the five day carbonaceous biochemical oxygen demand
5.	cm	centimetre(s)
6.	cm^2	square centimetre(s)
7.	CPVC	chlorinated poly (vinyl chloride)
8.	dB(A)	decibel-weighted sound level
9.	°	degree(s)
10.	°C	degree(s) Celsius
11.	diam	diameter
12.	DWV	drain, waste and vent
13.	ft	foot (feet)
14.	g	gram(s)
15.	ga	gauge
16.	gal	imperial gallon(s)
17.	gal/min	imperial gallon(s) per minute
18.	h	hour(s)
19.	HVAC	heating, ventilating and air-conditioning
20.	Hz	hertz
21.	in	inch(es)
22.	J	joule(s)
23.	kg	kilogram(s)
24.	kg/m^2	kilograms per square metre
25.	kN	kilonewton(s)
26.	kPa	kilopascal(s)
27.	kW	kilowatt(s)
28.	L	litre(s)
29.	L/s	litre(s) per second
30.	lx	lux
31.	m	metre(s)
32.	m^2	square metre(s)
33.	m/s	metre(s) per second
34.	max.	maximum
35.	mg/L	milligram(s) per litre
36.	min	minute(s)
37.	MJ	megajoule(s)
38.	mm	millimetre(s)
39.	MPa	megapascal(s)
40.	N	newton
41.	N/A	not applicable
42.	ng	nanogram(s)
43.	No.	number(s)
44.	nom.	nominal
45.	o.c.	on centre
46.	OSB	oriented strandboard
47.	Pa	pascal(s)
48.	PB	polybutylene
49.	PE	polyethylene
50.	PE/AL/PE	polyethylene/aluminum/polyethylene
51.	PEX	cross-linked polyethylene
52.	PEX/AL/PEX	crosslinked polyethylene/aluminum/crosslinked polyethylene
53.	PVC	poly (vinyl chloride)
54.	RSI	thermal resistance, International System of Units
55.	s	second(s)

COLUMN 1	COLUMN 2	COLUMN 3
Item	Symbol or Abbreviation	Meaning
56.	temp.	temperature
57.	T&G	tongue and groove
58.	W	watt(s)
59.	wt	weight
60.	%	percent

Section 1.5. Referenced Documents and Organizations

1.5.1. Referenced Documents

1.5.1.1. Application of Referenced Documents

(1) The provisions of a referenced document in Divisions A and B apply only to the extent that the provisions relate to,

(a) *buildings*, and

(b) the *objectives* and *functional statements* attributed to the applicable *acceptable solutions* in Division B where the document is referenced.

1.5.1.2. Conflicting Requirements

(1) In the case of a conflict between the provisions of this Code and those of a referenced document, the provisions of this Code shall govern.

1.5.1.3. Applicable Editions

(1) Where documents are referenced in this Code, they shall be the editions designated in Subsection 1.3.1. of Division B.

1.5.2. Organizations

1.5.2.1. Abbreviations of Proper Names

(1) The abbreviations of proper names in this Code shall have the meanings assigned to them in Article 1.3.2.1. of Division B.

O. Reg. 350/06, Division A, Part 1.

PART 2
OBJECTIVES

Section	**2.1.**	**Application**
	2.1.1.	**Application**
Section	**2.2.**	**Objectives**
	2.2.1.	**Objectives**

2.1. Application

2.1.1. Application

2.1.1.1. Application of Objectives

(1) The *objectives* set out in Table 2.2.1.1. apply only to the extent that they relate to compliance with this Code as required in Article 1.2.1.1.

Section 2.2. Objectives

2.2.1. Objectives

2.2.1.1. Objectives

(1) The *objectives* of this Code shall be those set out in Table 2.2.1.1.

Table 2.2.1.1.
Objectives

Forming Part of Sentence 2.2.1.1.(1)

COLUMN 1 Category	COLUMN 2 Number	COLUMN 3 *Objective*
Safety	OS	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, a person in or adjacent to the *building* will be exposed to an unacceptable risk of injury.
Safety — Fire Safety	OS1	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, a person in or adjacent to the *building* will be exposed to an unacceptable risk of injury due to fire.
	OS1.1	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, a person in or adjacent to the *building* will be exposed to an unacceptable risk of injury due to fire caused by a fire or explosion.
	OS1.2	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, a person in or adjacent to the *building* will be exposed to an unacceptable risk of injury due to fire caused by fire or explosion impacting areas beyond its point of origin.
	OS1.3	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, a person in or adjacent to the *building* will be exposed to an unacceptable risk of injury due to fire caused by the collapse of physical elements due to a fire or explosion.
	OS1.4	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, a person in or adjacent to the *building* will be exposed to an unacceptable risk of injury due to fire caused by fire safety systems failing to function as expected.
	OS1.5	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, a person in or adjacent to the *building* will be exposed to an unacceptable risk of injury due to fire caused by persons being delayed in or impeded from moving to a safe place during a fire emergency.
Safety — Structural Safety	OS2	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, a person in or adjacent to the *building* will be exposed to an unacceptable risk of injury due to structural failure.
	OS2.1	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, a person in or adjacent to the *building* will be exposed to an unacceptable risk of injury due to structural failure caused by loads bearing on the *building* elements that exceed their load-bearing capacity.
	OS2.2	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, a person in or adjacent to the *building* will be exposed to an unacceptable risk of injury due to structural failure caused by loads bearing on the *building* that exceed the *loadbearing* properties of the supporting medium.
	OS2.3	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, a person in or adjacent to the *building* will be exposed to an unacceptable risk of injury due to structural failure caused by damage to or deterioration of *building* elements.
	OS2.4	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, a person in or adjacent to the *building* will be exposed to an unacceptable risk of injury due to structural failure caused by vibration or deflection of *building* elements.
	OS2.5	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, a person in or adjacent to the *building* will be exposed to an unacceptable risk of injury due to structural failure caused by instability of the *building* or part of it.
	OS2.6	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, a person in or adjacent to the *building* will be exposed to an unacceptable risk of injury due to structural failure caused by collapse of the *excavation*.
Safety — Safety in Use	OS3	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of the *building*, a person in or adjacent to the *building* will be exposed to an unacceptable risk of injury due to hazards.
	OS3.1	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, a person in or adjacent to the *building* will be exposed to an unacceptable risk of injury due to hazards caused by tripping, slipping, falling, contact, drowning or collision.

COLUMN 1 Category	COLUMN 2 Number	COLUMN 3 *Objective*
	OS3.2	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, a person in or adjacent to the *building* will be exposed to an unacceptable risk of injury due to hazards caused by contact with hot surfaces or substances.
	OS3.3	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, a person in or adjacent to the *building* will be exposed to an unacceptable risk of injury due to hazards caused by contact with energized equipment.
	OS3.4	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, a person in or adjacent to the *building* will be exposed to an unacceptable risk of injury due to hazards caused by exposure to hazardous substances.
	OS3.5	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, a person in or adjacent to the *building* will be exposed to an unacceptable risk of injury due to hazards caused by exposure to high levels of sound from fire alarm systems.
	OS3.6	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, a person in or adjacent to the *building* will be exposed to an unacceptable risk of injury due to hazards caused by persons becoming trapped in confined spaces.
	OS3.7	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, a person in or adjacent to the *building* will be exposed to an unacceptable risk of injury due to hazards caused by persons being delayed in or impeded from moving to a safe place during an emergency.
Safety — Resistance to Unwanted Entry	OS4	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, a person in the *building* will be exposed to an unacceptable risk of injury due to the *building's* low level of resistance to unwanted entry.
	OS4.1	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, a person in the *building* will be exposed to an unacceptable risk of injury due to the *building's* low level of resistance to unwanted entry caused by intruders being able to force their way through locked doors or windows.
	OS4.2	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, a person in the *building* will be exposed to an unacceptable risk of injury due to the *building's* low level of resistance to unwanted entry caused by occupants being unable to identify potential intruders as such.
Health	OH	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, a person will be exposed to an unacceptable risk of illness.
Health — Indoor Conditions	OH1	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, a person in the *building* will be exposed to an unacceptable risk of illness due to indoor conditions.
	OH1.1	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, a person in the *building* will be exposed to an unacceptable risk of illness due to indoor conditions caused by inadequate indoor air quality.
	OH1.2	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, a person in the *building* will be exposed to an unacceptable risk of illness due to indoor conditions caused by inadequate thermal comfort.
	OH1.3	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, a person in the *building* will be exposed to an unacceptable risk of illness due to indoor conditions caused by contact with moisture.
Health — Sanitation	OH2	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, a person in or adjacent to the *building* will be exposed to an unacceptable risk of illness due to unsanitary conditions.
	OH2.1	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, a person in the *building* will be exposed to an unacceptable risk of illness due to unsanitary conditions caused by exposure to human or domestic waste.
	OH2.2	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, a person in the *building* will be exposed to an unacceptable risk of illness due to unsanitary conditions caused by consumption of contaminated water.
	OH2.3	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, a person in the *building* will be exposed to an unacceptable risk of illness due to unsanitary conditions caused by inadequate facilities for personal hygiene.
	OH2.4	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, a person in the *building* will be exposed to an unacceptable risk of illness due to unsanitary conditions caused by contact with contaminated surfaces.
	OH2.5	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, a person in the *building* will be exposed to an unacceptable risk of illness due to unsanitary conditions caused by contact with vermin and insects.

COLUMN 1 Category	COLUMN 2 Number	COLUMN 3 *Objective*
	OH2.6	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, a person adjacent to the *building* will be exposed to an unacceptable risk of illness due to unsanitary conditions caused by exposure to human or domestic waste.
Health — Noise Protection	OH3	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, a person in the *building* will be exposed to an unacceptable risk of illness due to high levels of sound originating in adjacent spaces in the *building*.
	OH3.1	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, a person in the *building* will be exposed to an unacceptable risk of illness due to high levels of sound originating in adjacent spaces in the *building* caused by exposure to airborne sound transmitted through assemblies separating *dwelling units* from adjacent spaces in the *building*.
Health — Vibration and Deflection Limitation	OH4	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, a person in the *building* will be exposed to an unacceptable risk of illness due to high levels of vibration or deflection of *building* elements.
Health — Hazardous Substances Containment	OH5	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, the public will be exposed to an unacceptable risk of illness due to the release of hazardous substances from the *building*.
Health — Privacy	OH6	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, a person in the *building* will be provided with an unacceptable level of privacy.
Health — View To The Outdoors	OH7	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, a person in the *building* will be unable to experience a view to the outdoors.
Accessibility	OA	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, a person with a physical or sensory disability will be unacceptably impeded from accessing or using the *building* or its facilities.
Accessibility — Barrier-free Path of Travel	OA1	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, a person with a physical or sensory disability will be unacceptably impeded from accessing the *building* or circulating within it.
Accessibility — Barrier-free Facilities	OA2	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, a person with a physical or sensory disability will be unacceptably impeded from using the *building's* facilities.
Fire, Structural, Water and Sewage Protection of Buildings	OP	An *objective* of this Code is to limit the probability that, as a result of its design or *construction*, the *building* or adjacent *buildings* will be exposed to an unacceptable risk of damage due to fire or structural insufficiency, or the *building* or part of it will be exposed to an unacceptable risk of loss of use also due to structural insufficiency.
Fire, Structural, Water and Sewage Protection of Buildings — Fire Protection of the Building	OP1	An *objective* of this Code is to limit the probability that, as a result of its design or *construction*, a *building* will be exposed to an unacceptable risk of damage due to fire.
	OP1.1	An *objective* of this Code is to limit the probability that, as a result of its design or *construction*, a *building* will be exposed to an unacceptable risk of damage due to fire caused by fire or explosion occurring.
	OP1.2	An *objective* of this Code is to limit the probability that, as a result of its design or *construction*, a *building* will be exposed to an unacceptable risk of damage due to fire caused by fire or explosion impacting areas beyond its point of origin.
	OP1.3	An *objective* of this Code is to limit the probability that, as a result of its design or *construction*, a *building* will be exposed to an unacceptable risk of damage due to fire caused by collapse of physical elements due to a fire or explosion.
	OP1.4	An *objective* of this Code is to limit the probability that, as a result of its design or *construction*, a *building* will be exposed to an unacceptable risk of damage due to fire caused by fire safety systems failing to function as expected.
Fire, Structural, Water and Sewage Protection of Buildings — Structural Sufficiency of the Building	OP2	An *objective* of this Code is to limit the probability that, as a result of its design or *construction*, a *building* or part of it will be exposed to an unacceptable risk of damage or loss of use due to structural failure or lack of structural serviceability.
	OP2.1	An *objective* of this Code is to limit the probability that, as a result of its design or *construction*, a *building* or part of it will be exposed to an unacceptable risk of damage or loss of use due to structural failure or lack of structural serviceability caused by loads bearing on the *building* elements that exceed their *loadbearing* capacity.
	OP2.2	An *objective* of this Code is to limit the probability that, as a result of its design or *construction*, a *building* or part of it will be exposed to an unacceptable risk of damage or loss of use due to structural failure or lack of structural serviceability caused by loads bearing on the *building* that exceed the *loadbearing* properties of the supporting medium.
	OP2.3	An *objective* of this Code is to limit the probability that, as a result of its design or *construction*, a *building* or part of it will be exposed to an unacceptable risk of damage or loss of use due to structural failure or lack of structural serviceability caused by damage to or deterioration of *building* elements.

COLUMN 1 Category	COLUMN 2 Number	COLUMN 3 *Objective*
	OP2.4	An *objective* of this Code is to limit the probability that, as a result of its design or *construction*, a *building* or part of it will be exposed to an unacceptable risk of damage or loss of use due to structural failure or lack of structural serviceability caused by vibration or deflection of *building* elements.
	OP2.5	An *objective* of this Code is to limit the probability that, as a result of its design or *construction*, a *building* or part of it will be exposed to an unacceptable risk of damage or loss of use due to structural failure or lack of structural serviceability caused by instability of the *building* or part of it.
	OP2.6	An *objective* of this Code is to limit the probability that, as a result of its design or *construction*, a *building* or part of it will be exposed to an unacceptable risk of damage or loss of use due to structural failure or lack of structural serviceability caused by instability or movement of the supporting medium.
Fire, Structural, Water and Sewage Protection of Buildings — Protection of Adjacent Buildings from Fire	OP3	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, adjacent *buildings* will be exposed to an unacceptable risk of damage due to fire.
	OP3.1	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, adjacent *buildings* will be exposed to an unacceptable risk of damage due to fire caused by fire or explosion impacting areas beyond the *building* of origin.
Fire, Structural, Water and Sewage Protection of Buildings — Protection of Adjacent Buildings from Structural Damage	OP4	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, adjacent *buildings* will be exposed to an unacceptable risk of structural damage.
	OP4.1	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, adjacent *buildings* will be exposed to an unacceptable risk of structural damage caused by settlement of the medium supporting adjacent *buildings*.
	OP4.2	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of the *building*, adjacent *buildings* will be exposed to an unacceptable risk of structural damage caused by collapse of the *building* or portion of it onto adjacent *buildings*.
	OP4.3	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, adjacent *buildings* will be exposed to an unacceptable risk of structural damage caused by impact of the *building* on adjacent *buildings*.
	OP4.4	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, adjacent *buildings* will be exposed to an unacceptable risk of structural damage caused by collapse of the excavation.
Fire, Structural, Water and Sewage Protection of Buildings — Water and Sewage Protection of Buildings and Facilities	OP5	An *objective* of this Code is to limit the probability that, as a result of its design or *construction*, a *building* will be exposed to unacceptable risk of damage due to leakage of service water or *sewage*.
Resource Conservation	OR	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, a natural resource will exposed to an unacceptable risk of depletion or the capacity of the infrastructure supporting the use of the resource will be exposed to an unacceptable risk of being exceeded.
Resource Conservation — Water Conservation	OR1	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, water resources will be exposed to an unacceptable risk of depletion or the capacity of the water supply, treatment and disposal infrastructure will be exposed to an unacceptable risk of being exceeded, caused by the consumption of water.
Resource Conservation — Energy Conservation	OR2	An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, a natural resource will be exposed to an unacceptable risk of depletion or the capacity of the infrastructure supporting the use of the resource will be exposed to an unacceptable risk of being exceeded, caused by the consumption of energy.
Environmental Integrity	OE	An *objective* of this Code is to limit the probability that, as a result of the design, *construction* or operation of a *building*, the natural environment will be exposed to an unacceptable risk of degradation.
Conservation of Buildings	OC	An *objective* of this Code is to limit the probability that, as a result of the extension, material alteration or repair of an existing *building* or a change in use of an existing *building*, the existing *building* cannot be acceptably conserved.

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PART 3
FUNCTIONAL STATEMENTS

Section **3.1.** **Application**
3.1.1. **Application of Functional Statements**

Section **3.2.** **Functional Statements**
3.2.1. **Functional Statements**

3.1. Application

3.1.1. Application

3.1.1.1. Application of Functional Statements

(1) The *functional statements* set out in Table 3.2.1.1. apply only to the extent that they relate to compliance with this Code as required in Article 1.2.1.1.

Section 3.2. Functional Statements

3.2.1. Functional Statements

3.2.1.1. Functional Statements

(1) The *functional statements* of this Code are those set out in Table 3.2.1.1.

Table 3.2.1.1.
Functional Statements

Forming Part of Sentence 3.2.1.1.(1)

COLUMN 1 Number	COLUMN 2 Function
F01	To minimize the risk of accidental ignition.
F02	To limit the severity and effects of fire or explosions.
F03	To retard the effects of fire on areas beyond its point of origin.
F04	To retard failure or collapse due to the effects of fire.
F05	To retard the effects of fire on emergency egress facilities.
F06	To retard the effects of fire on facilities for notification, suppression and emergency response.
F10	To facilitate the timely movement of persons to a safe place in an emergency.
F11	To notify persons, in a timely manner, of the need to take action in an emergency.
F12	To facilitate emergency response.
F13	To notify emergency responders, in a timely manner, of the need to take action in an emergency.
F20	To support and withstand expected loads and forces.
F21	To limit or accommodate dimensional change.
F22	To limit movement under expected loads and forces.
F23	To maintain equipment in place during structural movement.
F30	To minimize the risk of injury to persons as a result of tripping, slipping, falling, contact, drowning or collision.
F31	To minimize the risk of injury to persons as a result of contact with hot surfaces or substances.
F32	To minimize the risk of injury to persons as a result of contact with energized equipment.
F33	To limit the level of sound of a fire alarm system.
F34	To resist or discourage unwanted access or entry.
F35	To facilitate the identification of potential intruders.
F36	To minimize the risk that persons will be trapped in confined spaces.
F40	To limit the level of contaminants.
F41	To minimize the risk of generation of contaminants.
F42	To resist the entry of vermin and insects.
F43	To minimize the risk of release of hazardous substances.
F44	To limit the spread of hazardous substances beyond their point of release.
F45	To minimize the risk of the spread of diseases through communal shower facilities
F46	To minimize the risk of contamination of *potable* water.
F50	To provide air suitable for breathing.
F51	To maintain appropriate air and surface temperatures.
F52	To maintain appropriate relative humidity.
F53	To maintain appropriate indoor/outdoor air pressure differences.
F54	To limit drafts.
F55	To resist the transfer of air through environmental separators.
F56	To limit the transmission of airborne sound into a *dwelling unit* from spaces elsewhere in the *building*.

COLUMN 1 Number	COLUMN 2 Function
F60	To control the accumulation and pressure of water on and in the ground.
F61	To resist the ingress of precipitation, water or moisture from the exterior or from the ground.
F62	To facilitate the dissipation of water and moisture from the *building*.
F63	To limit moisture condensation.
F70	To provide *potable* water.
F71	To provide facilities for personal hygiene.
F72	To provide facilities for the sanitary disposal of human and domestic wastes.
F73	To facilitate access to and circulation in the *building* and its facilities by persons with physical or sensory disabilities.
F74	To facilitate the use of a *building's* facilities by persons with physical or sensory disabilities.
F80	To resist deterioration resulting from expected service conditions.
F81	To minimize the risk of malfunction, interference, damage, tampering, lack of use or misuse.
F82	To minimize the risk of inadequate performance due to improper maintenance or lack of maintenance.
	To limit unwanted visual exposure.
F101	To provide a view to the outdoors in *buildings*.
F102	
F110	To control the release of contaminants into *soil*, *groundwater*, *surface water* and air.
F111	To minimize the risk of malfunction, damage or failure of a *sewage system*.
F112	To provide adequate treatment of *sanitary sewage* and *effluent*.
F113	To minimize the risk of injury as a result of contact with *sanitary sewage* or partially treated *effluent*.
F120	To minimize the risk of injury to persons entering or exiting the pool, as a result of unfamiliarity with the pool.
F121	To minimize the risk of injury to persons using the pool, as a result of unfamiliarity with the pool.
F122	To minimize the risk of contamination of pool water.
F123	To facilitate timely response to incapacitated pool users.
F124	To minimize the risk of entrapment or injury to a person within the pool, as a result of water, air or vacuum action.
F130	To limit excessive water consumption.
F131	To limit excessive energy consumption.
F140	To facilitate the reuse and material alteration and repair of existing *buildings*.

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DIVISION B

PART 1
GENERAL

Section 1.1. General
1.1.1. Application
1.1.2. Climatic Data

Section 1.2. Reserved

Section 1.3. Referenced Documents and Organizations
1.3.1. Referenced Documents
1.3.2. Abbreviations

Section 1.1. General

1.1.1. Application

1.1.1.1. Application

(1) This Part applies to all *buildings* covered in this Code.

1.1.2. Climatic Data

1.1.2.1. Climatic and Seismic Design Values

(1) The climatic and seismic values required for the design of *buildings* under this Code shall be in conformance with the climatic and seismic values provided in Supplementary Standard SB-1.

(2) The outside winter design temperatures determined from Supplementary Standard SB-1 shall be those listed for the January 2.5% values.

1.1.2.2. Depth of Frost Penetration

(1) Depth of frost penetration shall be established on the basis of local experience.

Section 1.2. Reserved

Section 1.3. Referenced Documents and Organizations

1.3.1. Referenced Documents

1.3.1.1. Effective Date

(1) Unless otherwise specified in this Code, the documents referenced in this Code shall include all amendments, revisions and supplements effective to May 31, 2006.

1.3.1.2. Applicable Editions

(1) Where documents are referenced in this Code, they shall be in the editions designated in Column 2 of Table 1.3.1.2.

Table 1.3.1.2.
Documents Referenced in the Ontario Building Code

Forming Part of Sentence 1.3.1.2.(1)

COLUMN 1 Issuing Agency	COLUMN 2 Document Number	COLUMN 3 Title of Document	COLUMN 4 Code Reference
ACGIH	2004, 25th Edition	Industrial Ventilation Manual	6.2.1.1.(1)
ANSI	A208.1-1999	Particleboard, Mat-Formed Wood	Table 5.10.1.1. 9.23.14.2.(3) 9.29.9.1.(1) 9.30.2.2.(1)
ANSI	B16.18-2001	Cast Copper Alloy Solder Joint Pressure Fittings	7.2.7.6.(1) 7.2.7.6.(2) Table 7.2.11.2.
ANSI/ASME	A112.19.8M-1987	Suction Fittings for Use in Swimming Pools, Wading Pools, Spas, Hot Tubs, and Whirlpool Bathtub Appliances	3.12.4.1.(9)
ANSI/ASME	B16.3-1998	Malleable Iron Threaded Fittings	7.2.6.6.(1)
ANSI/ASME	B16.4-1998	Gray Iron Threaded Fittings	7.2.6.5.(1) Table 7.2.11.2.
ANSI/ASME	B16.12-1998	Cast Iron Threaded Drainage Fittings	7.2.6.3.(1)
ANSI/ASME	B16.15-1985	Cast Bronze Threaded Fittings, Classes 125 and 250	7.2.7.3.(1)
ANSI/ASME	B16.22-2001	Wrought Copper and Copper Alloy Solder Joint Pressure Fittings	7.2.7.6.(1)
ANSI/ASME	B16.24-2001	Cast Copper Alloy Pipe Flanges and Flanged Fittings: Classes 150, 300, 400, 600, 900, 1500 and 2500	7.2.7.2.(1)
ANSI/ASME	B16.26-1988	Cast Copper Alloy Fittings for Flared Copper Tubes	7.2.7.7.(1) 7.2.7.7.(2) Table 7.2.11.2.
ANSI/ASME	B16.29-2001	Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings - DWV	7.2.7.5.(1)
ANSI/ASME	B18.6.1-1981	Wood Screws (Inch Series)	Table 5.10.1.1. 9.23.3.1.(2)
ANSI/ASHRAE	62-2001	Ventilation for Acceptable Indoor Air Quality	6.2.2.1.(2)
ANSI/ASHRAE/ IESNA	90.1-2004	Energy Efficient Design of New Buildings Except Lowrise Residential Buildings	6.2.2.1.(1) 12.2.1.1.(2)
ANSI/AWWA	C104 / A21.4-2004	Cement-Mortar Lining for Ductile-Iron Pipe Fittings for Water	7.2.6.4.(2) Table 7.2.11.2. 12.2.1.2.(2)
ANSI/AWWA	C110 / A21.10-2003	Ductile-Iron and Gray-Iron Fittings, 3 in. Through 48 in. (75 mm Through 1200 mm), for Water and Other Liquids	7.2.6.4.(3) Table 7.2.11.2.
ANSI/AWWA	C111 / A21.11-2000	Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fitting	7.2.6.4.(4) Table 7.2.11.2.
ANSI/AWWA	C151 / A21.51-2002	Ductile-Iron Pipe, Centrifugally Cast, for Water	7.2.6.4.(1) Table 7.2.11.2.
ANSI/CSA	ANSI Z21.22-1999 / CSA 4.4-M99 including Addenda 1 ANSI Z21.22a-2000 / CSA 4.4a -2000	Relief Valves for Hot Water Supply Systems	7.2.10.11.(1)

COLUMN 1 Issuing Agency	COLUMN 2 Document Number	COLUMN 3 Title of Document	COLUMN 4 Code Reference
	Addenda 2 ANSI Z21.22b-2001 / CSA 4.4b-2001		
APHA/AWWA/WEF	2005, 21st Edition	Standard Methods for the Examination of Water and Waste Water	8.9.2.4.(1)(b)
ASHRAE	2005	Fundamentals	6.2.1.1.(1)
ASHRAE	2003	HVAC Applications	6.2.1.1.(1)
ASHRAE	2004	HVAC Systems and Equipment	6.2.1.1.(1)
ASHRAE	2002	Refrigeration	6.2.1.1.(1)
ASME	B16.23-2002	Cast Copper Alloy Solder Joint Drainage Fittings: DWV	7.2.7.5.(1)
ASSE	1010-2004	Water Hammer Arresters	7.2.10.15.(1)
ASSE	1051-2002	Individual and Branch Type Air Admittance Valves for Sanitary Drainage Systems	7.2.10.16.(1)
ASTM	A53 / A53M-02	Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless	7.2.6.7.(4)
ASTM	A123 / A123M-02	Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products	Table 5.10.1.1. Table 9.20.16.1.
ASTM	A153 / A153M-03	Zinc Coating (Hot-Dip) on Iron and Steel Hardware	Table 5.10.1.1. Table 9.20.16.1.
ASTM	A252-98	Welded and Seamless Steel Pipe Piles	4.2.3.8.(1)
ASTM	A283 / A283M-03	Low and Intermediate Tensile Strength Carbon Steel Plates	4.2.3.8.(1)
ASTM	A518 / A518M-99	Corrosion-Resistant High-Silicon Iron Castings	7.2.8.1.(1)
ASTM	A653 / A653M-03	Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process	Table 5.10.1.1. 9.3.3.2.(1)
ASTM	A792 / A792M-03	Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process	9.3.3.2.(1)
ASTM	A1008 / A1008M-04	Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low Alloy with Improved Formability	4.2.3.8.(1)
ASTM	A1011 / A1011M-03a	Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low Alloy with Improved Formability	4.2.3.8.(1)
ASTM	B32-03	Solder Metal	7.2.9.2.(2)
ASTM	B42-02e1	Seamless Copper Pipe, Standard Sizes	7.2.7.1.(1)
ASTM	B43-98e1	Seamless Red Brass Pipe, Standard Sizes	7.2.7.1.(2)
ASTM	B68-02	Seamless Copper Tube, Bright Annealed	7.2.7.4.(3)
ASTM	B88-03	Seamless Copper Water Tube	7.2.7.4.(1) Table 7.2.11.2.
ASTM	B306-02	Copper Drainage Tube (DWV)	7.2.7.4.(1)
ASTM	B813-00e1	Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy and Tube	7.2.9.2.(3)
ASTM	B828-02	Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings	7.3.2.4.(1)
ASTM	C4-03	Clay Drain Tile and Perforated Clay Drain Tile	Table 5.10.1.1. 9.14.3.1.(1)
ASTM	C27-98	Classification for Fire Clay and High-Alumina Refractory Brick	9.21.3.4.(1)
ASTM	C36 / C36M-03	Gypsum Wallboard	3.1.5.12.(4) Table 5.10.1.1. 9.29.5.2.(1)
ASTM	C37 / C37M-01	Gypsum Lath	Table 5.10.1.1. 9.29.5.2.(1)
ASTM	C79 / C79M-04	Treated Core and Nontreated Core Gypsum Sheathing Board	Table 5.10.1.1. 9.29.5.2.(1)
ASTM	C126-99	Ceramic Glazed Structural Clay Facing Tile, Facing Brick, and Solid Masonry Units	Table 5.10.1.1. 9.20.2.1.(1)
ASTM	C212-00	Structural Clay Facing Tile	Table 5.10.1.1. 9.20.2.1.(1)
ASTM	C260-01	Air-Entraining Admixtures for Concrete	9.3.1.8.(1)

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ASTM	C411-97	Hot-Surface Performance of High-Temperature Thermal Insulation	6.2.3.4.(3) 6.2.9.2.(2)
ASTM	C412M-03	Concrete Drain Tile (Metric)	Table 5.10.1.1. 9.14.3.1.(1)
ASTM	C442 / C442M-04	Gypsum Backing Board, and Gypsum Coreboard, and Gypsum Shaftliner Board	3.1.5.12.(4) Table 5.10.1.1. 9.29.5.2.(1)
ASTM	C444M-03	Perforated Concrete Pipe (Metric)	Table 5.10.1.1. 9.14.3.1.(1)
ASTM	C494 / C494M-04	Chemical Admixtures for Concrete	9.3.1.8.(1)
ASTM	C588 / C588M-03	Gypsum Base for Veneer Plasters	3.1.5.12.(4) Table 5.10.1.1. 9.29.5.2.(1)
ASTM	C630 / C630M-03	Water-Resistant Gypsum Backing Board	3.1.5.12.(4) Table 5.10.1.1. 9.29.5.2.(1)
ASTM	C700-02	Vitrified Clay Pipe, Extra Strength, Standard Strength and Perforated	Table 5.10.1.1. 9.14.3.1.(1)
ASTM	C931 / C931M-04	Exterior Gypsum Soffit Board	3.1.5.12.(4) Table 5.10.1.1. 9.29.5.2.(1)
ASTM	C960 / C960M-04	Predecorated Gypsum Board	3.1.5.11.(4) Table 5.10.1.1. 9.29.5.2.(1)
ASTM	C1002-01	Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs	Table 5.10.1.1. 9.24.1.4.(1) 9.29.5.7.(1)
ASTM	C1053-00	Borosilicate Glass Pipe and Fittings for Drain, Waste and Vent (DWV) Applications	7.2.8.1.(1)
ASTM	C1177 / C1177M-04e1	Glass Mat Gypsum Substrate for Use as Sheathing	Table 5.10.1.1. Table 9.23.16.2.A.
ASTM	C1178 / C1178M-04	Glass Mat Water-Resistant Gypsum Backing Panel	Table 5.10.1.1. 9.29.5.2.(1)
ASTM	C1395 / C1395M-04	Gypsum Ceiling Board	Table 5.10.1.1. 9.29.5.2.(1)
ASTM	C1396 / C1396M-03a	Gypsum Board	Table 5.10.1.1. 9.29.5.2.(1)
ASTM	D374-99	Thickness of Solid Electrical Insulation	3.15.4.1.(1)(c)
ASTM	D568-77	Rate of Burning and/or Extent and Time of Burning of Flexible Plastics in a Vertical Position	3.15.4.1.(1)(b)
ASTM	D635-03	Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position	3.15.4.1.(1)(a)
ASTM	D2178-97a	Asphalt Glass Felt Used in Roofing and Waterproofing	Table 5.10.1.1.
ASTM	D2898-94	Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing	3.1.5.5.(4) 3.1.5.21.(1)
ASTM	D3261-03	Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing	7.2.5.5.(3)
ASTM	E90-04	Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements	5.9.1.1.(1) 9.11.1.1.(1)
ASTM	E96-00e1	Water Vapour Transmission of Materials	5.5.1.2.(3) 9.25.1.2.(1) 9.25.4.2.(1) 9.30.1.2.(1)

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ASTM	E283-04	Determining the Rate of Air Leakage through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differentiation Across the Specimen	9.6.5.4.(1) 9.6.5.5.(1) 9.7.1.7.(1) 12.3.3.13.(1)
ASTM	E336-97e1	Measurement of Airborne Sound Insulation in Buildings	5.9.1.1.(1) 9.11.1.1.(1)
ASTM	E413-87	Classification for Rating Sound Insulation	5.9.1.1.(1) 9.11.1.1.(1)
ASTM	E2190-02	Insulating Glass Unit Performance and Evaluation	9.7.3.1.(1)
ASTM	F476-84	Security of Swinging Door Assemblies	9.6.8.10.(1)
ASTM	F628-01	Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 Plastic Drain, Waste, and Vent Pipe With a Cellular Core	7.2.5.10.(1) 7.2.5.12.(1)
ASTM	F714-03	Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter	7.2.5.6.(1)
AWPA	M4-02	Care of Preservative-Treated Wood Products	4.2.3.2.(2) Table 5.10.1.1.
BNQ	NQ3624-115-2000	Polyethylene (PE) Pipe and Fittings - Flexible Corrugated Pipes for Drainage - Characteristics and Test Methods	Table 5.10.1.1. 9.14.3.1.(1)
CCFBC	NRCC 38730	Model National Energy Code for Buildings 1997	6.2.2.1.(1) 12.2.1.1.(2) 12.2.1.2.(2)
CCFBC	NRCC 47677	National Fire Code of Canada 2005	3.3.1.2.(1) 3.3.5.2.(1) 6.2.2.5.(1)
CCFBC	NRCC 38732	National Farm Building Code of Canada 1995	1.3.1.2.(1) of Division A 1.3.1.2.(2) of Division A 1.3.1.2.(3) of Division A 1.3.1.2.(4) of Division A 4.4.5.1.(1)
CGSB	CAN/CGSB-1.501-M89	Method of Permeance of Coated Wallboard	5.5.1.2.(2) 9.25.4.2.(6)
CGSB	CAN/CGSB-7.1-98	Lightweight Steel Wall Framing Components	9.24.1.2.(1)
CGSB	CAN/CGSB-7.2-97	Adjustable Steel Columns	9.17.3.4.(1)
CGSB	CAN/CGSB-10.3-92	Air Setting Refractory Mortar	9.21.3.4.(2) 9.21.3.9.(1) 9.22.2.2.(2)
CGSB	CAN/CGSB-11.3-M87	Hardboard	Table 5.10.1.1. 9.27.10.1.(2) 9.29.7.1.(1) 9.30.2.2.(1)
CGSB	CAN/CGSB-11.5-M87	Hardboard, Precoated, Factory Finished, for Exterior Cladding	Table 5.10.1.1. 9.27.10.1.(1)
CGSB	CAN/CGSB-12.1-M90	Tempered or Laminated Safety Glass	3.3.1.19.(2) 3.4.6.14.(1) 3.4.6.14.(3) Table 5.10.1.1. 9.6.6.2.(2) 9.7.3.1.(1) 9.8.8.7.(1)
CGSB	CAN/CGSB-12.2-M91	Flat, Clear Sheet Glass	Table 5.10.1.1. 9.7.3.1.(1)
CGSB	CAN/CGSB-12.3-M91	Flat, Clear Float Glass	Table 5.10.1.1. 9.7.3.1.(1)
CGSB	CAN/CGSB-12.4-M91	Heat Absorbing Glass	Table 5.10.1.1. 9.7.3.1.(1)
CGSB	CAN/CGSB-12.5-M86	Mirrors, Silvered	9.6.6.3.(2)
CGSB	CAN/CGSB-12.8-97	Insulating Glass Units	Table 5.10.1.1. 9.7.3.1.(1)
CGSB	CAN/CGSB-12.10-M76	Glass, Light and Heat Reflecting	Table 5.10.1.1. 9.7.3.1.(1)

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CGSB	CAN/CGSB-12.11-M90	Wired Safety Glass	3.3.1.19.(2) 3.4.6.14.(1) 3.4.6.14.(3) Table 5.10.1.1. 9.6.6.2.(2) 9.7.3.1.(1) 9.8.8.7.(1)
CGSB	CAN/CGSB-12.20-M89	Structural Design of Glass for Buildings	4.3.6.1.(1) 9.7.3.2.(1)
CGSB	19-GP-5M-1984	Sealing Compound, One Component, Acrylic Base, Solvent Curing	Table 5.10.1.1. 9.27.4.2.(2)
CGSB	CAN/CGSB-19.13-M87	Sealing Compound, One Component, Elastomeric, Chemical Curing	Table 5.10.1.1. 9.27.4.2.(2)
CGSB	19-GP-14M-1984	Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing	Table 5.10.1.1. 9.27.4.2.(2)
CGSB	CAN/CGSB-19.22-M89	Mildew Resistant Sealing Compound for Tubs and Tile	9.29.10.5.(1)
CGSB	CAN/CGSB-19.24-M90	Multicomponent, Chemical-Curing Sealing Compound	Table 5.10.1.1. 9.27.4.2.(2)
CGSB	CAN/CGSB-34.4-M89	Siding, Asbestos-Cement, Shingles and Clapboards	Table 5.10.1.1. 9.27.8.1.(1)
CGSB	CAN/CGSB-34.5-M89	Sheets, Asbestos-Cement, Corrugated	Table 5.10.1.1. 9.27.8.1.(1)
CGSB	CAN/CGSB-34.9-M94	Asbestos-Cement Sewer Pipe	7.2.5.1.(2)
CGSB	CAN/CGSB-34.14-M89	Sheets, Asbestos-Cement, Decorative	Table 5.10.1.1. 9.27.8.1.(1)
CGSB	CAN/CGSB-34.16-M89	Sheets, Asbestos-Cement, Flat, Fully Compressed	Table 5.10.1.1. 9.27.8.1.(1)
CGSB	CAN/CGSB-34.17-M89	Sheets, Asbestos-Cement, Flat, Semicompressed	Table 5.10.1.1. 9.27.8.1.(1)
CGSB	CAN/CGSB-34.21-M89	Panels, Sandwich, Asbestos-Cement with Insulating Cores	Table 5.10.1.1. 9.27.8.1.(1)
CGSB	CAN/CGSB-34.22-94	Asbestos-Cement Drain Pipe	Table 5.10.1.1. 7.2.5.1.(1) 9.14.3.1.(1)
CGSB	CAN/CGSB-34.23-94	Asbestos-Cement House Connection Sewer Pipe	7.2.5.1.(2)
CGSB	CAN/CGSB-37.1-M89	Chemical Emulsified Type, Emulsified Asphalt for Dampproofing	Table 5.10.1.1. 9.13.2.2.(1)
CGSB	CAN/CGSB-37.2-M88	Emulsified Asphalt, Mineral Colloid Type, Unfilled, for Dampproofing and Waterproofing and for Roof Coatings	Table 5.10.1.1. 9.13.2.2.(1) 9.13.3.2.(1)
CGSB	CAN/CGSB-37.3-M89	Application of Emulsified Asphalts for Dampproofing or Waterproofing	5.8.2.3.(1) Table 5.10.1.1. 9.13.2.3.(1) 9.13.3.3.(1)
CGSB	CAN/CGSB-37.4-M89	Fibrated, Cutback Asphalt, Lap Cement for Asphalt Roofing	Table 5.10.1.1. 9.26.2.1.(1)
CGSB	CAN/CGSB-37.5-M89	Cutback Asphalt Plastic Cement	Table 5.10.1.1. 9.26.2.1.(1)
CGSB	37-GP-6Ma-1983	Asphalt, Cutback, Unfilled, for Dampproofing	5.8.2.2.(6) 5.8.2.2.(7) Table 5.10.1.1. 9.13.2.2.(1)
CGSB	CAN/CGSB-37.8-M88	Asphalt, Cutback, Filled, for Roof Coating	Table 5.10.1.1. 9.26.2.1.(1)
CGSB	37-GP-9Ma-1983	Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing	Table 5.10.1.1. 9.26.2.1.(1)

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CGSB	37-GP-12Ma-1984	Application of Unfilled Cutback Asphalt for Dampproofing	5.8.2.3.(2) Table 5.10.1.1. 9.13.2.3.(1)
CGSB	CAN/CGSB-37.16-M89	Filled, Cutback Asphalt for Dampproofing and Waterproofing	Table 5.10.1.1. 9.13.2.2.(1) 9.13.3.2.(1)
CGSB	37-GP-18Ma-1985	Tar, Cutback, Unfilled, for Dampproofing	5.8.2.2.(6) 5.8.2.2.(7) Table 5.10.1.1. 9.13.2.2.(1)
CGSB	37-GP-21M-1985	Tar, Cutback, Fibrated, For Roof Coating	Table 5.10.1.1. 9.26.2.1.(1)
CGSB	CAN/CGSB-37.22-M89	Application of Unfilled, Cutback Tar Foundation Coating for Dampproofing	5.8.2.3.(2) Table 5.10.1.1. 9.13.2.3.(1)
CGSB	37-GP-36M-1976	Application of Filled Cutback Asphalt for Dampproofing and Waterproofing	5.8.2.3.(1) T able 5.10.1.1.
CGSB	37-GP-37M-1977	Application of Hot Asphalt for Dampproofing or Waterproofing	5.8.2.3.(1) Table 5.10.1.1.
CGSB	CAN/CGSB-37.50-M89	Hot Applied, Rubberized Asphalt for Roofing and Waterproofing	Table 5.10.1.1. 9.26.2.1.(1)
CGSB	CAN/CGSB-37.51-M90	Application for Hot Applied Rubberized Asphalt for Roofing and Waterproofing	5.6.1.3.(1) 5.8.2.3.(1) Table 5.10.1.1. 9.26.15.1.(1)
CGSB	37-GP-52M-1984	Roofing and Waterproofing Membrane, Sheet Applied, Elastomeric	Table 5.10.1.1. 9.26.2.1.(1)
CGSB	CAN/CGSB-37.54-95	Polyvinyl Chloride Roofing and Waterproofing Membrane	Table 5.10.1.1. 9.26.2.1.(1)
CGSB	37-GP-55M-1979	Application of Sheet Applied Flexible Polyvinyl Chloride Roofing Membrane	5.6.1.3.(1) Table 5.10.1.1. 9.26.16.1.(1)
CGSB	37-GP-56M-1985	Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing	Table 5.10.1.1. 9.26.2.1.(1)
CGSB	37-GP-64M-1977	Mat Reinforcing, Fibrous Glass, for Membrane Waterproofing Systems and Built-up Roofing	Table 5.10.1.1.
CGSB	41-GP-6M-1983	Sheets, Thermosetting Polyester Plastics, Glass Fiber Reinforced	Table 5.10.1.1. 9.26.2.1.(1)
CGSB	CAN/CGSB-41.24-95	Rigid Vinyl Siding, Soffits and Fascia	Table 5.10.1.1. 9.27.13.1.(1)
CGSB	CAN/CGSB-51.25-M87	Thermal Insulation, Phenolic, Faced	Table 5.10.1.1. Table 9.23.16.2.A. 9.25.2.2.(1)
CGSB	51-GP-27M-1979	Thermal Insulation, Polystyrene, Loose Fill	Table 5.10.1.1. 9.25.2.2.(1)
CGSB	CAN/CGSB-51.32-M77	Sheathing, Membrane, Breather Type	Table 5.10.1.1. 9.20.13.9.(1) 9.26.2.1.(1) 9.27.3.2.(1)
CGSB	CAN/CGSB-51.33-M89	Vapour Barrier, Sheet, Excluding Polyethylene, for Use in Building Construction	Table 5.10.1.1. 9.25.4.2.(5)

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CGSB	CAN/CGSB-51.34-M86 (amended 1988)	Vapour Barrier, Polyethylene Sheet for Use in Building Construction	Table 5.10.1.1. 9.13.2.2.(1) 9.13.4.2.(1) 9.18.6.2.(1) 9.25.3.2.(2) 9.25.4.2.(4)
CGSB	CAN/CGSB-63.14-M89	Plastic Skylights	5.10.1.1.(4) Table 5.10.1.1. 9.7.7.1.(1) 9.7.7.2.(1)
CGSB	CAN/CGSB-82.1-M89	Sliding Doors	Table 5.10.1.1. 9.6.5.2.(1)
CGSB	CAN/CGSB-82.5-M88	Insulated Steel Doors	Table 5.10.1.1. 9.6.5.3.(1)
CGSB	CAN/CGSB-82.6-M86	Doors, Mirrored Glass, Sliding or Folding, Wardrobe	9.6.6.3.(1)
CGSB	CAN/CGSB-93.1-M85	Sheet, Aluminum Alloy, Prefinished Residential	Table 5.10.1.1. 9.27.12.1.(4)
CGSB	CAN/CGSB-93.2-M91	Prefinished Aluminum Siding, Soffits and Facsia for Residential Use	Table 5.10.1.1. 9.27.12.1.(3)
CGSB	CAN/CGSB-93.3-M91	Prefinished Galvanized and Aluminum-Zinc Alloy Steel Sheet for Residential Use	Table 5.10.1.1. 9.27.12.1.(2)
CGSB	CAN/CGSB-93.4-92	Galvanized Steel and Aluminum-Zinc Alloy Coated Steel Siding, Soffits and Fascia, Prefinished, Residential	Table 5.10.1.1. 9.27.12.1.(1)
CSA	CAN/CSA-6.19-01	Residential Carbon Monoxide Alarming Devices	6.2.12.3.(1) 9.33.4.3.(1)
CSA	CAN/CSA-A23.1-04	Concrete Materials and Methods of Concrete Construction	4.2.3.6.(1) 4.2.3.9.(1) Table 5.10.1.1. 9.3.1.1.(4) 9.3.1.3.(1) 9.3.1.4.(1) 9.40.1.4.(1)
CSA	A23.3-04	Design of Concrete Structures	Table 4.1.8.9. 4.3.3.1.(1)
CSA	A60.1-M1976	Vitrified Clay Pipe	7.2.5.4.(1)
CSA	A60.3-M1976	Vitrified Clay Pipe Joints	7.2.5.4.(2)
CSA	CAN/CSA-A82.1-M87	Burned Clay Brick (Solid Masonry Units Made From Clay or Shale)	Table 5.10.1.1. 9.20.2.1.(1)
CSA	A82.3-M1978	Calcium Silicate (Sand-Lime) Building Brick	Table 5.10.1.1. 9.20.2.1.(1)
CSA	A82.4-M1978	Structural Clay Load-Bearing Wall Tile	Table 5.10.1.1. 9.20.2.1.(1)
CSA	A82.5-M1978	Structural Clay Non-Load-Bearing Tile	Table 5.10.1.1. 9.20.2.1.(1)
CSA	CAN3-A82.8-M78	Hollow Clay Brick	Table 5.10.1.1. 9.20.2.1.(1)
CSA	CAN/CSA-A82.27-M91	Gypsum Board	3.1.5.12.(4) Table 5.10.1.1. Table 9.23.16.2.A. 9.29.5.2.(1)
CSA	A82.30-M1980	Interior Furring, Lathing and Gypsum Plastering	Table 5.10.1.1. 9.29.4.1.(1)
CSA	A82.31-M1980	Gypsum Board Application	Table 5.10.1.1. 9.10.12.4.(3) 9.29.5.1.(2)
CSA	CAN3-A93-M82	Natural Airflow Ventilators for Buildings	Table 5.10.1.1. 9.19.1.2.(5)

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CSA	CAN/CSA-A123.1-98	Asphalt Shingles Made from Organic Felt and Surfaced with Mineral Granules	Table 5.10.1.1. 9.26.2.1.(1)
CSA	A123.2-03	Asphalt Coated Roofing Sheets	Table 5.10.1.1. 9.26.2.1.(1)
CSA	CAN/CSA-A123.3-98	Asphalt Saturated Organic Roofing Felt	Table 5.10.1.1. 9.26.2.1.(1)
CSA	CAN/CSA-A123.4-04	Asphalt for Constructing Built-Up Roof Coverings and Waterproofing Systems	Table 5.10.1.1. 9.13.2.2.(1) 9.13.3.2.(1) 9.26.2.1.(1)
CSA	CAN/CSA-A123.5-98	Asphalt Shingles Made from Glass Felt and Surfaced with Mineral Granules	Table 5.10.1.1. 9.26.2.1.(1)
CSA	A123.17-1963	Asphalt-Saturated Felted Glass-Fibre Mat for Use in Construction of Built-Up Roofs	Table 5.10.1.1. 9.26.2.1.(1)
CSA	CAN3-A123.51-M85	Asphalt Shingle Application on Roof Slopes 1:3 and Steeper	5.6.1.3.(1) Table 5.10.1.1. 9.26.1.2.(1)
CSA	CAN3-A123.52-M85	Asphalt Shingle Application on Roof Slopes 1:6 to Less than 1:3	5.6.1.3.(1) Table 5.10.1.1. 9.26.1.2.(1)
CSA	A165.1-04	Concrete Block Masonry Units	Table 5.10.1.1. 9.15.2.2.(1) 9.17.5.1.(1) 9.20.2.1.(1) 9.20.2.6.(1)
CSA	A165.2-04	Concrete Brick Masonry Units	Table 5.10.1.1. 9.20.2.1.(1)
CSA	A165.3-04	Prefaced Concrete Masonry Units	Table 5.10.1.1. 9.20.2.1.(1)
CSA	CAN3-A165.4-M85	Autoclaved Cellular Units	Table 5.10.1.1. 9.20.2.1.(1)
CSA	A179-04	Mortar and Grout for Unit Masonry	Table 5.10.1.1. 9.15.2.2.(3) 9.20.3.1.(1)
CSA	CAN/CSA-A220.0-M91	Performance of Concrete Roof Tiles	Table 5.10.1.1. 9.26.2.1.(1)
CSA	CAN/CSA-A220.1-M91	Installation of Concrete Roof Tiles	Table 5.10.1.1. 9.26.17.1.(1)
CSA	A257 Series-03	Standards for Concrete Pipe and Manhole Sections	7.2.5.3.(1)
CSA	A257.4-03	Precast Reinforced Circular Concrete Manhole Sections, Catch Basins, and Fittings	7.2.5.3.(5)
CSA	CAN/CSA-A277 01	Procedures for Certification of Factory-Built Houses	9.1.1.9.(1)
CSA	CAN/CSA-A324-M88	Clay Flue Liners	9.21.3.3.(1)
CSA	A371-04	Masonry Construction for Buildings	5.6.1.3.(2) Table 5.10.1.1. 9.15.2.2.(3) 9.20.3.2.(7) 9.20.15.2.(1)
CSA	CAN/CSA-A405-M87	Design and Construction of Masonry Chimneys and Fireplaces	9.21.3.5.(1) 9.22.1.4.(1) 9.22.5.2.(2)
CSA	CAN/CSA-A438-00	Concrete Construction for Housing and Small Buildings	9.3.1.1.(1)
CSA	CAN/CSA-A440-00	Windows	5.10.1.1.(3) Table 5.10.1.1. 9.7.2.1.(1) 9.7.2.1.(2) 9.7.6.1.(1)

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CSA	CAN/CSA-A440.1-00	User Selection Guide to CSA Standard CAN/CSA-A440-00, Windows	5.10.1.1.(3) Table 5.10.1.1. 9.7.2.1.(1)
CSA	CAN/CSA-A440.2-04	Energy Performance Evaluation of Windows and Sliding Glass Doors	12.3.1.3.(1)
CSA	A660-04	Certification of Manufacturers of Steel Building Systems	4.3.4.3.(1)
CSA	CAN/CSA-A3001-03	Cementitious Materials for Use in Concrete	Table 5.10.1.1. 9.3.1.2.(1) 9.28.2.1.(1)
CSA	B44-00	Safety Code for Elevators	3.2.6.7.(2) 3.5.2.1.(1) 3.5.2.1.(2) 3.5.2.1.(3) 3.5.4.2.(1) Table 4.1.5.12. 7.4.3.6.(1)
CSA	CAN/CSA-B45.0-02	General Requirements for Plumbing Fixtures	7.6.4.2.(1)
CSA	CAN/CSA-B45.1-02	Ceramic Plumbing Fixtures	7.2.2.2.(2)
CSA	CAN/CSA-B45.2-02	Enamelled Cast Iron Plumbing Fixtures	7.2.2.2.(3)
CSA	CAN/CSA-B45.3-02	Porcelain-Enamelled Steel Plumbing Fixtures	7.2.2.2.(4)
CSA	CAN/CSA-B45.4-02	Stainless Steel Plumbing Fixtures	7.2.2.2.(5)
CSA	CAN/CSA-B45.5-02	Plastic Plumbing Fixtures	7.2.2.2.(6)
CSA	CAN/CSA-B45.9-02	Macerating Systems and Related Components	7.2.2.2.(8)
CSA	CAN/CSA-B45.10-01	Hydromassage Bathtubs	7.2.2.2.(7)
CSA	B52-99	Mechanical Refrigeration Code	6.2.2.4.(4)
CSA	CAN/CSA-B64.0-01	Definitions, General Requirements, and Test Methods for Vacuum Breakers and Backflow Preventers	7.2.10.10.(1)
CSA	CAN/CSA-B64.1.1-01	Vacuum Breakers, Atmospheric Type (AVB)	7.2.10.10.(1)
CSA	CAN/CSA-B64.1.2-01	Vacuum Breakers, Pressure Type (PVB)	7.2.10.10.(1)
CSA	CAN/CSA-B64.2-01	Vacuum Breakers, Hose Connection Type (HCVB)	7.2.10.10.(1)
CSA	CAN/CSA-B64.2.1-01	Vacuum Breakers, Hose Connection Type (HCVB) with Manual Draining Feature	7.2.10.10.(1)
CSA	CAN/CSA-B64.2.2-01	Vacuum Breakers, Hose Connection Type (HCVB) with Automatic Draining Feature	7.2.10.10.(1)
CSA	CAN/CSA-B64.3-01	Backflow Preventers, Dual Check Valve Type Atmospheric Port (DACP)	7.2.10.10.(1)
CSA	CAN/CSA-B64.4-01	Backflow Preventers, Reduced Pressure Principle Type (RP)	7.2.10.10.(1) 7.6.2.3.(4)
CSA	CAN/CSA-B64.4.1-01	Backflow Preventers, Reduced Pressure Principle Type for Fire Systems (RPF)	7.6.2.4.(2); Table 7.6.2.4. 7.6.2.4.(4)
CSA	CAN/CSA-B64.5-01	Backflow Preventers, Double Check Valve Type (DCVA)	7.2.10.10.(1)
CSA	CAN/CSA-B64.5.1-01	Backflow Preventers, Double Check Valve Type for Fire Systems (DCVAF)	7.6.2.4.(2) Table 7.6.2.4.
CSA	CAN/CSA-B64.6-01	Backflow Preventers, Dual Check Valve Type (DuC)	7.2.10.10.(1)
CSA	CAN/CSA-B64.6.1-01	Backflow Preventers, Dual Check Valve Type for Fire Systems (DuCF)	7.6.2.4.(2) Table 7.6.2.4.
CSA	CAN/CSA-B64.7-01	Vacuum Breakers, Laboratory Faucet Type (LFVP)	7.2.10.10.(1)
CSA	CAN/CSA-B64.8-01	Backflow Preventers, Dual Check Valve Type with Intermediate Vent (DuCV)	7.2.10.10.(1)
CSA	CAN/CSA-B64.9-01	Backflow Preventers, Single Check Valve Type for Fire Systems (SCVAF)	7.6.2.4.(2) Table 7.6.2.4.
CSA	CAN/CSA-B64.10-01	Manual for the Selection and Installation of Backflow Prevention Devices	7.2.10.10.(1)
CSA	B66-05	Design, Material, and Manufacturing Requirements for Prefabricated Septic Tanks and Sewage Holding Tanks	8.2.2.2.(1) 8.2.2.2.(2) 8.2.2.2.(3) 8.2.2.3.(7)

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CSA	CAN/CSA-B70-02	Cast Iron Soil Pipe, Fittings and Means of Joining	7.2.6.1.(1) 7.4.6.4.(2)
CSA	B111-1974	Wire Nails, Spikes and Staples	9.23.3.1.(1) 9.26.2.2.(1) 9.29.5.6.(1)
CSA	CAN/CSA-B125-01	Plumbing Fittings	7.2.3.3.(1) 7.2.10.6.(1) 7.2.10.7.(1) 7.2.10.7.(2) 7.2.10.10.(2)
CSA	B127.1-99	Asbestos Cement Drain, Waste and Vent Pipe and Pipe Fittings	7.2.5.1.(1) 7.2.6.2.(1)
CSA	B127.2-M1977	Components for Use in Asbestos Cement Building Sewer Systems	7.2.5.1.(2) 7.2.6.2.(1)
CSA	CAN/CSA-B137.1-02	Polyethylene Pipe, Tubing and Fittings for Cold Water Pressure Services	7.2.5.5.(1)
CSA	CAN/CSA-B137.2-02	PVC Injection-Moulded Gasketed Fittings for Pressure Applications	7.2.5.8.(1) 7.2.5.10.(1) Table 7.2.11.2.
CSA	CAN/CSA-B137.3-02	Rigid Polyvinyl Chloride (PVC) Pipe for Pressure Applications	7.2.5.8.(1) 7.2.5.10.(1) Table 7.2.11.2.
CSA	CAN/CSA-B137.5-02	Crosslinked Polyethylene (PEX) Tubing Systems for Pressure Applications	7.2.5.7.(1) Table 7.2.11.2.
CSA	CAN/CSA-B137.6-02	CPVC Pipe, Tubing and Fittings for Hot and Cold Water Distribution Systems	7.2.5.9.(1) 7.2.5.9.(2) Table 7.2.11.2.
CSA	CAN/CSA-B137.7-02	Polybutylene (PB) Pipe for Cold Water Distribution Systems	Table 7.2.11.2.
CSA	CAN/CSA-B137.9-99	Polyethylene/Aluminium/Polyethylene Composite Pressure Pipe Systems	7.2.5.13.(1) Table 7.2.11.2.
CSA	CAN/CSA-B137.10-02	Crosslinked Polyethylene/Aluminum Crosslinked Polyethylene Composite Pressure Pipe Systems	7.2.5.14.(1) Table 7.2.11.2.
CSA	CAN/CSA-B137.11-02	Polypropylene (PP-R) Pipe and Fittings for Pressure Applications	7.2.5.15.(1)
CSA	B158.1-1976	Cast Brass Solder Joint Drainage, Waste and Vent Fittings	7.2.7.5.(1) 7.2.10.1.(1)
CSA	CAN/CSA-B181.1-02	ABS Drain, Waste, and Vent Pipe and Pipe Fittings	7.2.5.10.(1) 7.2.5.11.(1) 7.2.5.12.(1) 7.2.5.12.(2) 7.2.10.1.(2) 7.4.6.4.(2)
CSA	CAN/CSA-B181.2-02	PVC Drain, Waste, and Vent Pipe and Pipe Fittings	7.2.5.10.(1) 7.2.5.11.(1) 7.2.5.12.(1) 7.2.5.12.(2) 7.2.10.1.(3)
CSA	CAN/CSA-B181.3-02	Polyolefin Laboratory Drainage Systems	7.2.8.1.(1)
CSA	CAN/CSA-B182.1-02	Plastic Drain and Sewer Pipe and Pipe Fittings	Table 5.10.1.1. 7.2.5.10.(1) 7.2.5.12.(2) 7.4.6.4.(2) 9.14.3.1.(1)
CSA	CAN/CSA-B182.2-02	PVC Sewer Pipe and Fittings (PSM Type)	7.2.5.10.(1) 7.2.5.12.(2)
CSA	CAN/CSA-B182.4-02	Profile (Ribbed) PVC Sewer Pipe and Fittings	7.2.5.10.(1)

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CSA	CAN/CSA-B182.6-02	Profile Polyethylene Sewer Pipe and Fittings	7.2.5.10.(1)
CSA	CAN/CSA-B182.7-02	Multilayer PVC Sewer Pipe (PSM Type) Having Reprocessed-Recycled Content	7.2.5.10.(1)
CSA	CAN/CSA-B214-01	Installation Code for Hydronic Heating Systems	6.2.1.4.(6)
CSA	B242-M1980	Groove and Shoulder Type Mechanical Pipe Couplings	7.2.10.4.(1)
CSA	CAN/CSA-B272-93	Prefabricated Self-Sealing Vent Flashings	7.2.10.14.(2)
CSA	CAN/CSA-B355-00	Lifts for Persons with Physical Disabilities	3.8.3.5.(1)
CSA	CAN/CSA-B356-00	Water Pressure Reducing Valves for Domestic Water Supply Systems	7.2.10.12.(1)
CSA	CAN/CSA-B365-01	Installation Code for Solid-Fuel Burning Appliances and Equipment	6.2.1.4.(1) 9.21.1.3.(2) 9.22.10.2.(1) 9.33.1.2.(1)
CSA	CAN/CSA-B366.1-M91	Solid Fuel-Fired Central Heating Appliances	6.2.1.4.(2)
CSA	CAN/CSA-B602-99	Mechanical Couplings for Drain, Waste, and Vent Pipe and Sewer Pipe	7.2.5.3.(2) 7.2.10.4.(2)
CSA	CAN/CSA-C22.2 No. 0.3-01	Test Methods for Electrical Wires and Cables	3.1.4.3.(1) 3.1.4.3.(2) 3.1.5.18.(1) 3.1.5.18.(2) 3.1.5.21.(1) 3.1.5.21.(2) 3.6.4.3.(1)
CSA	C22.2 No.113-M1984	Fans and Ventilators	9.32.3.9.(5)
CSA	C22.2 No. 141-02	Unit Equipment for Emergency Lighting	3.2.7.4.(2) 9.9.11.3.(6)
CSA	C22.2 No. 211.0-03	General Requirements and Methods of Testing for Nonmetallic Conduit	3.1.5.20.(1)
CSA	CAN/CSA-C22.3 No. 1-01	Overhead Systems	3.1.19.1.(2)
CSA	CAN/CSA-C88-M90	Power Transformers and Reactors	3.6.2.7.(10)
CSA	CAN/CSA-C260-M90	Rating for the Performance of Residential Mechanical Ventilating Equipment	9.32.3.9.(1) 9.32.3.9.(2) Table 9.32.3.9.
CSA	C282-05	Emergency Electrical Power Supply for Buildings	3.2.7.5.(1)
CSA	CAN/CSA-C439-00	Rating the Performance of Heat/Energy-Recovery Ventilators	6.2.1.6.(2) 9.32.3.11.(2)
CSA	CAN/CSA-C448.1-02	Design and Installation of Earth Energy Systems for Commercial and Institutional Buildings	6.2.1.4.(4)
CSA	CAN/CSA-C448.2-02	Design and Installation of Earth Energy Systems for Residential and Other Small Buildings	6.2.1.4.(3)
CSA	CAN/CSA-F280-M90	Determining the Required Capacity of Residential Space Heating and Cooling Appliances	6.2.1.1.(1)
CSA	CAN/CSA-F326-M91	Residential Mechanical Ventilation Systems	6.2.1.1.(1)
CSA	CAN/CSA-F379.1-88	Solar Domestic Hot Water Systems (Liquid to Liquid Heat Transfer)	7.2.10.13.(1)
CSA	CAN/CSA-F383-87	Installation Code for Solar Domestic Hot Water Systems	7.6.1.13.(1)
CSA	CAN/CSA-G30.18-M92	Billet Steel Bars for Concrete Reinforcement	9.3.1.1.(4) 9.40.1.3.(1)
CSA	CAN/CSA-G40.21-04	Structural Quality Steel	4.2.3.8.(1) Table 5.10.1.1. 9.23.4.3.(2)
CSA	CAN/CSA-G164-M92	Hot Dip Galvanising of Irregularly Shaped Articles	4.4.4.1.(4)
CSA	G401-01	Corrugated Steel Pipe Products	7.2.6.8.(1) Table 5.10.1.1. 9.14.3.1.(1)
CSA	O80 Series-97	Wood Preservation	3.1.4.4.(1) 4.2.3.2.(1) 4.2.3.2.(2) Table 5.10.1.1.

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CSA	O80.1-97	Preservative Treatment of All Timber Products by Pressure Processes	Table 5.10.1.1. 9.3.2.9.(5)
CSA	O80.2-97	Preservative Treatment of Lumber, Timber, Bridge Ties and Mine Ties by Pressure Processes	4.2.3.2.(1) Table 5.10.1.1. 9.3.2.9.(5)
CSA	O80.3-97	Preservative Treatment of Piles by Pressure Processes	4.2.3.2.(1)
CSA	O80.9-97	Preservative Treatment of Plywood by Pressure Processes	Table 5.10.1.1. 9.3.2.9.(5)
CSA	O80.15-97	Preservative Treatment of Wood for Building Foundation Systems, Basements and Crawl Spaces by Pressure Processes	4.2.3.2.(1) Table 5.10.1.1. 9.3.2.9.(5)
CSA	O80.34-97	Preservative Treatment of Lumber and Timbers with Borates for Use Out of Ground Contact and Continuously Protected from Liquid Water	Table 5.10.1.1. 9.3.2.9.(5) 9.3.2.9.(6)
CSA	CAN/CSA-O86-01 (Including Supplement CAN/CSA-O86S1-05)	Engineering Design in Wood	Table 4.1.8.9. 4.3.1.1.(1)
CSA	O115-M1982	Hardwood and Decorative Plywood	Table 5.10.1.1. 9.27.9.1.(1) 9.30.2.2.(1)
CSA	O118.1-97	Western Cedars Shakes and Shingles	Table 5.10.1.1. 9.26.2.1.(1) 9.27.7.1.(1)
CSA	O118.2-M81	Eastern White Cedar Shingles	Table 5.10.1.1. 9.26.2.1.(1) 9.27.7.1.(1)
CSA	O121-M1978	Douglas Fir Plywood	Table 5.10.1.1. 9.23.14.2.(1) 9.23.15.2.(1) Table 9.23.16.2.A. 9.27.9.1.(1) 9.30.2.2.(1) Table A-13 Table A-14 Table A-15
CSA	CAN/CSA-O122-M89	Structural Glued-Laminated Timber	Table A-11 Table A-16
CSA	CAN/CSA-O132.2 Series-90	Wood Flush Doors	Table 5.10.1.1. 9.6.5.1.(1)
CSA	O141-05	Softwood Lumber	Table 5.10.1.1. 9.3.2.6.(1)
CSA	O151-04	Canadian Softwood Plywood	Table 5.10.1.1. 9.23.14.2.(1) 9.23.15.2.(1) Table 9.23.16.2.A. 9.27.9.1.(1) 9.30.2.2.(1) Table A-13 Table A-14 Table A-15
CSA	O153-M1980	Poplar Plywood	Table 5.10.1.1. 9.23.14.2.(1) 9.23.15.2.(1) Table 9.23.16.2.A. 9.27.9.1.(1) 9.30.2.2.(1)

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CSA	CAN/CSA-O177-M89	Qualification Code for Manufacturers of Structural Glued-Laminated Timber	4.3.1.2.(1) Table A-11 Table A-16
CSA	CAN/CSA-O325.0-92	Construction Sheathing	Table 5.10.1.1. 9.23.14.2.(1) 9.23.14.4.(2) Table 9.23.14.5.B. 9.23.15.2.(1) 9.23.15.3.(2) Table 9.23.15.7.B. Table 9.23.16.2.B. 9.29.9.1.(2) 9.29.9.2.(5) Table A-13 Table A-14 Table A-15
CSA	O437.0-93	OSB and Waferboard	Table 5.10.1.1. 9.23.14.2.(1) 9.23.14.4.(2) 9.23.15.2.(1) 9.23.15.3.(2) Table 9.23.16.2.A. 9.27.11.1.(1) 9.29.9.1.(2) 9.30.2.2.(1) Table A-13 Table A-14 Table A-15
CSA	CAN/CSA-S16-01 (Including Supplement CAN/CSA-S16S1-05)	Limit States Design of Steel Structures	Table 4.1.8.9. 4.3.4.1.(1)
CSA	S37-01	Antennas, Towers and Antenna Supporting Structures	4.1.1.4.(2)
CSA	CAN/CSA-S136-01 (Including Supplement CAN/CSA-S136S1-04)	North American Specifications for the Design of Cold Formed Steel Structural Members (using the Appendix B provisions applicable to Canada)	4.3.4.2.(1)
CSA	CAN3-S157-M83	Strength Design in Aluminum	4.3.5.1.(1)
CSA	S304.1-04	Design of Masonry Structures	Table 4.1.8.9. 4.3.2.1.(1)
CSA	S307-M1980	Load Test Procedure for Wood Roof Trusses for Houses and Small Buildings	9.23.13.11.(5)
CSA	CAN3-S367-M81	Air Supported Structures	4.4.1.1.(1)
CSA	CAN/CSA-S406-92	Construction of Preserved Wood Foundations	9.13.2.8.(1) 9.15.2.4.(1) 9.16.5.1.(1)
CSA	CAN/CSA-S413-94	Parking Structures	4.4.2.1.(1)
CSA	S478-95	Guideline on Durability in Buildings	5.1.4.2.(3)
CSA	Z32-04	Electrical Safety and Essential Electrical Systems in Health Care Facilities	3.2.7.3.(4) 3.2.7.6.(1)
CSA	CAN/CSA-Z91-M90	Safety Code for Window Cleaning Operations	4.4.4.1.(1)
CSA	CAN/CSA-Z240.2.1-92	Structural Requirements for Mobile Homes	9.1.1.9.(1) 9.12.2.2.(6) 9.15.1.3.(1)
CSA	CAN/CSA-Z240.3.1-92	Plumbing Requirements for Mobile Homes	9.1.1.9.(1)
CSA	CSA Z240.10.1-94	Site Preparation, Foundation and Anchorage of Mobile Homes	9.15.1.3.(1) 9.23.6.3.(1)
CSA	CAN/CSA-Z241 Series-03	Park Model Trailers	9.39.1.1.(1) 9.39.2.1.(1)
CSA	CAN/CSA-Z305.1-92	Non-Flammable Medical Gas Piping Systems	3.7.3.1.(1)
CSA	CAN/CSA-Z317.2-01	Special Requirements for Heating, Ventilation and Air Conditioning (HVAC) Systems in Health Care Facilities	6.2.1.1.(1)

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CWC	2004	Engineering Guide for Wood Frame Construction	9.4.1.1.(1)
DBR	Building Research Note No. 126, 1979	Relation Between Thermal Resistance and Heat Storage in Building Enclosures	12.3.3.8.(1)
DBR	Technical Paper No. 194, May 1965	Fire Endurance of Protected Steel Columns and Beams	Table 11.5.1.1.A. Table 11.5.1.1.B. Table 11.5.1.1.C. Table 11.5.1.1.D/E. Table 11.5.1.1.F.
DBR	Technical Paper No. 207, October 1965	Fire Endurance of Unit Masonry Walls	Table 11.5.1.1.A. Table 11.5.1.1.B. Table 11.5.1.1.C. Table 11.5.1.1.D/E. Table 11.5.1.1.F.
DBR	Technical Paper No. 222, June 1966	Fire Endurance of Light Framed and Miscellaneous Assemblies	Table 11.5.1.1.A. Table 11.5.1.1.B. Table 11.5.1.1.C. Table 11.5.1.1.D/E. Table 11.5.1.1.F.
FINA	2005	Rules and Regulations - FINA Facilities Rules 2005-2009 - FR5 Diving Facilities	3.11.4.1.(17)
HI	2005	Hydronics Institute Manuals	6.2.1.1.(1)
HRAI	2005	Digest	6.2.1.1.(1) 6.2.3.5.(1) 6.2.4.3.(12)
HUD	Rehabilitation Guidelines No. 8 - 1980	Guideline on Fire Ratings of Archaic Materials and Assemblies	Table 11.5.1.1.A. Table 11.5.1.1.B. Table 11.5.1.1.C. Table 11.5.1.1.D/E. Table 11.5.1.1.F.
HVI	HVI 915-2006	Procedure for Loudness Rating of Residential Fan Products	9.32.3.9.(2) Table 9.32.3.9.
HVI	HVI 916-2005	Airflow Test Procedure	9.32.3.9.(1)
ISO	ISO 8201; 1987(E)	Acoustics - Audible Emergency Evacuation Signal	3.2.4.18.(2)
MAH	Supplementary Standard SA-1, June, 2006	Objectives and Functional Statements Attributed to the Acceptable Solutions	1.2.1.1.(1) of Division A 1.2.1.1.(2) of Division A
MAH	Supplementary Standard SB-1, June, 2006	Climatic and Seismic Data	5.2.1.1.(1) 5.2.1.1.(2) 9.4.1.1.(3) 9.4.2.2.(1) Table 9.25.1.2. Table 9.32.3.10.A. 9.33.3.2.(1) Table 12.3.2.1. Table 12.3.4.2.A.
MAH	Supplementary Standard SB-2, June, 2006	Fire Performance Ratings	3.1.5.23.(1); 3.1.7.1.(2) 3.1.8.14.(2); 3.1.9.5.(1) 3.1.9.5.(2); 3.1.12.1.(3) 3.2.3.12.(1); 3.2.3.13.(4) 3.13.2.1.(8); 3.13.3.5.(1) 3.13.3.6.(2); 3.13.4.2.(7) 9.10.3.1.(1); 9.10.3.2.(1) 9.10.5.1.(4); 9.10.9.9.(1) 9.10.13.14.(1)
MAH	Supplementary Standard SB-3, June, 2006	Fire and Sound Resistance of Building Assemblies	9.10.3.1.(1) 9.11.2.1.(1) 9.11.2.1.(2)

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MAH	Supplementary Standard SB-4, June, 2006	Measures for Fire Safety in High Buildings	3.2.6.9.(3) 3.2.6.10.(2) 3.2.6.14.(1)
MAH	Supplementary Standard SB-5, June, 2006	Approved Sewage Treatment Units	8.6.2.2.(5)
MAH	Supplementary Standard SB-6, June, 2006	Percolation Times and Soil Descriptions	8.2.1.2.(2)
MAH	Supplementary Standard SB-7, June, 2006	Construction Requirements for Guards	9.8.8.2.(5)
MAH	Supplementary Standard SB-8, June, 2006	Design, Construction and Installation of Anchorage Systems for Fixed Access Ladders	3.6.1.5.(1)
MAH	Supplementary Standard SB-9, June, 2006	Requirements for Soil Gas Control	9.13.4.1.(1) 9.13.4.2.(2) to (4)
MAH	Supplementary Standard SB-10, June, 2006	Energy Efficiency Supplement	12.2.1.1.(2) 12.3.4.1.(1) 12.3.4.4.(3) 12.3.4.6.(1) 12.3.4.7.(3) 12.3.4.12.(1)
MAH	Supplementary Standard SB-11, June, 2006	Construction of Farm Buildings	1.3.1.2.(4) of Division A
MAH	Supplementary Standard SC-1, June, 2006	Code of Conduct for Registered Code Agencies	3.7.4.1.(2) of Division C
MOE	Guidelines 1985, with Subsequent Revision	Guidelines for the Design of Sanitary Sewage Works, Storm Sewers, Water Storage Facilities, Water Distribution Systems, Servicing in areas subject to adverse conditions, Water Supply for small residential development and seasonally operated water supply	7.1.6.5.(1)
NFPA	2005 Publication	National Fire Codes	6.2.1.1.(1)
NFPA	13-1999	Installation of Sprinkler Systems	3.2.4.8.(2); 3.2.4.16.(1) 3.2.5.13.(1); 3.2.8.4.(7) 3.3.2.12.(3); 3.15.1.1.(3) 3.15.1.1.(4); 3.15.1.5.(2) 3.15.1.6.(2); 3.15.2.1.(1) 3.15.2.2.(1); 3.15.3.1.(1)
NFPA	13D-2002	Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes	3.2.5.13.(3)
NFPA	13R-2002	Installation of Sprinkler Systems in Residential Occupancies up to and including Four Stories in Height	3.2.5.13.(2)
NFPA	14-2003	Installation of Standpipe, Private Hydrants and Hose Systems	3.2.9.2.(1)
NFPA	20-2003	Installation of Stationary Pumps for Fire Protection	3.2.5.19.(1)
NFPA	24-2002	Installation of Fire Service Mains and Their Appurtenances	7.2.11.1.(1)
NFPA	80-1999	Fire Doors and Windows	3.1.8.5.(2) 3.1.8.10.(2) 3.1.8.12.(2) 3.1.8.12.(3) 3.1.8.14.(1) 3.12.3.1.(2) 9.10.13.1.(1)
NFPA	82-2004	Incinerators, Waste and Linen Handling Systems and Equipment	6.2.6.1.(1) 9.10.10.5.(2)
NFPA	96-2001	Ventilation Control and Fire Protection of Commercial Cooking Operations	6.2.2.6.(1)
NFPA	130-2003	Fixed Guideway Transit and Passenger Rail Systems	3.12.7.1.(1)
NFPA	211-2003	Chimneys, Fireplaces, Vents and Solid Fuel-Burning Appliances	6.3.1.2.(2) 6.3.1.3.(1)
NFPA	214-2005	Water-Cooling Towers	6.2.3.14.(3)
NFPA	701-2004	Fire Tests for Flame Propagation of Textiles and Films	3.14.1.6.(1) 3.14.2.5.(1)

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NLGA	2004	Standard Grading Rules for Canadian Lumber (Interpretation Included)	1.4.1.2.(1) of Division A 9.3.2.1.(1) Table 9.3.2.1. Tables A-1 to A-10
NRCan	January 2005	Energuide for New Houses: Administrative and Technical Procedures	12.2.1.1.(3) 12.2.1.2.(3)
NSF/ANSI	46-2005	Evaluation of Components and Devices Used in Wastewater Treatment Systems	8.6.2.1.(2)
SMACNA	1995, 2nd Ediiton	HVAC Duct Construction Standards - Metal and Flexible	6.2.4.2.(3) 12.3.4.5.(1) 12.3.4.5.(2)
TC		Canadian Aviation Regulations - Part III	4.1.5.14.
TPIC	1996	Truss Design Procedures and Specifications for Light Metal Plate Connected Wood Trusses	9.23.13.11.(6)
UL	UL 300-2005	Fire Extinguishing Systems for Protection of Restaurant Cooking Areas	6.2.2.6.(2)
UL	UL 2034-1996	Single and Multiple Station Carbon Monoxide Alarms	6.2.3.12.(1) 9.33.4.3.(1)
ULC	CAN/ULC-S101-04	Fire Endurance Tests of Building Construction and Materials	3.1.5.12.(3) 3.1.5.12.(4) 3.1.5.12.(6) 3.1.7.1.(1) 3.1.11.7.(1) 3.2.3.8.(1) 3.2.6.9.(6)
ULC	CAN/ULC-S102-03	Test for Surface Burning Characteristics of Building Materials and Assemblies	3.1.5.25.(1) 3.1.12.1.(1)
ULC	CAN/ULC-S102.2-03	Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies	3.1.12.1.(2) 3.1.13.4.(1)
ULC	S102.3-M82	Fire Test of Light Diffusers and Lenses	3.1.13.4.(1)
ULC	CAN4-S104-M80	Fire Tests of Door Assemblies	3.1.8.4.(1) 3.2.6.9.(3)
ULC	CAN4-S105-M85	Fire Door Frames Meeting the Performance Required by CAN4-S104	9.10.13.6.(1)
ULC	CAN4-S106-M80	Fire Tests of Window and Glass Block Assemblies	3.1.8.4.(1)
ULC	CAN/ULC-S107-03	Fire Tests of Roof Coverings	3.1.15.1.(1)
ULC	CAN/ULC-S109-03	Flame Tests of Flame-Resistant Fabrics and Films	3.1.16.1.(1) 3.14.1.6.(1) 3.14.2.5.(1) 6.2.3.17.(1) 6.2.3.18.(1) 6.2.4.9.(1)
ULC	CAN/ULC-S110-M86	Tests for Air Ducts	6.2.3.2.(2) 6.2.3.2.(4)
ULC	ULC-S111-95	Fire Tests for Air Filter Units	6.2.3.13.(1) 6.2.4.14.(1)
ULC	CAN/ULC-S112-M90	Fire Test of Fire-Damper Assemblies	3.1.8.4.(1)
ULC	CAN/ULC-S112.1-M90	Leakage Rated Dampers for Use in Smoke Control Systems	6.2.3.9.(3)
ULC	CAN4-S112.2-M84	Fire Test of Ceiling Firestop Flap Assemblies	3.1.9.5.(2) 3.6.4.3.(2)
ULC	CAN4-S113-79	Wood Core Doors Meeting the Performance Required by CAN4-S104-77 for Twenty Minute Fire Rated Closure Assemblies	9.10.13.2.(1)
ULC	CAN4-S114-M80	Test for Determination of Non-Combustibility in Building Materials	1.4.1.2.(1) of Division A
ULC	ULC-S115-95	Fire Tests of Firestop Systems	3.1.5.16.(3) 3.1.9.1.(1) 3.1.9.1.(2) 3.1.9.4.(4) 9.10.9.7.(3)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
Issuing Agency	Document Number	Title of Document	Code Reference
ULC	CAN4-S124-M85	Test for the Evaluation of Protective Coverings for Foamed Plastic	3.1.5.12.(2)
ULC	CAN/ULC-S126-M86	Test for Fire Spread Under Roof-Deck Assemblies	3.1.14.1.(1) 3.1.14.2.(1)
ULC	CAN/ULC-S134-92	Fire Test of Exterior Wall Assemblies	3.1.5.5.(1)
ULC	CAN/ULC-S135-04	Test Method for the Determination of Combustibility Parameters of Building Materials Using an Oxygen Consumption Calorimeter (Cone Calorimeter)	3.1.5.1.(2)
ULC	ULC-S139-00	Fire Test for Evaluation of Integrity of Electrical Cables	3.2.7.10.(2)
ULC	S505-1974	Fusible Links for Fire Protection Service	3.1.8.9.(1)
ULC	S513-1978	Threaded Couplings for 38 mm and 65 mm Fire Hose	3.2.9.2.(7)
ULC	CAN/ULC-S524-01	Installation of Fire Alarm Systems	3.2.4.5.(1)
ULC	CAN/ULC-S531-02	Smoke Alarms	3.2.4.21.(1) 9.10.19.1.(1)
ULC	CAN/ULC-S537-04	Verification of Fire Alarm Systems	3.2.4.5.(2)
ULC	S543-M84	Internal Lug Quick Connect Couplings for Fire Hoses	3.2.9.2.(7)
ULC	CAN/ULC-S553-02	Installation of Smoke Alarms	3.2.4.21.(7)
ULC	CAN/ULC-S561-03	Installation and Services for Fire Signal Receiving Centres and Systems	3.2.4.7.(4)
ULC	CAN/ULC-S610-M87	Factory-Built Fireplaces	9.22.8.1.(1)
ULC	ULC-S628-93	Fireplace Inserts	9.22.10.1.(1)
ULC	CAN/ULC-S629-M87	650°C Factory-Built Chimneys	9.21.1.2.(1)
ULC	CAN/ULC-S639-M87	Steel Liner Assemblies for Solid Fuel-Burning Masonry Fireplaces	9.22.2.3.(1)
ULC	CAN/ULC-S701-01	Thermal Insulation, Polystyrene, Boards and Pipe Covering	Table 5.10.1.1. 9.15.4.1.(1) Table 9.23.16.2.A. 9.25.2.2.(1) 9.25.2.2.(4)
ULC	CAN/ULC-S702-97	Mineral Fibre Thermal Insulation for Buildings	Table 5.10.1.1. Table 9.23.16.2.A. 9.25.2.2.(1)
ULC	CAN/ULC-S703-01	Cellulose Fibre Insulation (CFI) for Buildings	Table 5.10.1.1. 9.25.2.2.(1)
ULC	CAN/ULC-S704-03	Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced	Table 5.10.1.1. Table 9.23.16.2.A. 9.25.2.2.(1)
ULC	CAN/ULC-S705.1-01	Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density - Material Specification	Table 5.10.1.1. 9.25.2.2.(1)
ULC	CAN/ULC-S705.2-98	Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density, Installers's Responsibilities - Specification	Table 5.10.1.1. 9.25.2.2.(1) 9.25.2.5.(1)
ULC	CAN/ULC-S706-02	Wood Fibre Thermal Insulation for Buildings	Table 5.10.1.1. 9.23.15.7.(3) Table 9.23.16.2.A. 9.25.2.2.(1) 9.29.8.1.(1)
ULC	ULC/ORD-C263.1-99	Sprinkler-Protected Window Systems	3.1.8.18.(1)
ULC	ULC/ORD-C199P-02	Combustible Piping for Sprinkler Systems	3.2.5.14.(2) 3.2.5.14.(5)
ULC	ULC/ORD-C376-1995	Fire Growth of Foamed Plastic Insulated Building Panels in a Full-Scale Room Configuration	3.1.5.12.(7)
ULC	ULC/ORD-C1254.6-1995	Fire Testing of Restaurant Cooking Area Fire Extinguishing System Units	6.2.2.6.(2)

1.3.2. Abbreviations

1.3.2.1. Abbreviations of Proper Names

(1) In this Code, an abbreviation of proper names listed in Column 1 of Table 1.3.2.1. shall have the meaning assigned opposite it in Column 2.

TABLE 1.3.2.1.
ABBREVIATIONS OF PROPER NAMES

COLUMN 1	COLUMN 2
Abbreviation	Meaning
ACGIH	American Conference of Governmental Industrial Hygienists
ANSI	American National Standards Institute
APHA	American Public Health Association
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
ASME	The American Society of Mechanical Engineers
ASSE	American Society of Sanitary Engineering
ASTM	American Society for Testing and Materials
AWPA	American Wood-Preservers' Association
AWWA	American Water Works Association
BNQ	Bureau de Normalisation du Québec
CAN	National Standard of Canada designation The number or name following the CAN designation represents the agency under whose auspices the standard is issued. CAN1 designates CGA, CAN2 designates CGSB, CAN3 designates CSA, and CAN4 designates ULC.
CCBFC	Canadian Commission on Building and Fire Codes
CGSB	Canadian General Standards Board
CSA	Canadian Standards Association
CWC	Canadian Wood Council
DBR	Division of Building Research, known as the Institute for Research in Construction since 1985
FINA	Fédération Internationale de Natation Amateur
HI	Hydronics Institute
HRAI	Heating, Refrigerating and Air-Conditioning Institute of Canada
HVI	Home Ventilating Institute
IESNA	Illuminating Engineering Society of North America
ISO	International Organization for Standardization
HUD	U.S. Department of Housing and Urban Development
MAH	Ontario Ministry of Municipal Affairs and Housing
MOE	Ontario Ministry of the Environment
NFPA	National Fire Protection Association
NLGA	National Lumber Grades Authority
NRCan	Natural Resources Canada
NSF	NSF International, formerly called National Sanitation Federation
SMACNA	Sheet Metal and Air Conditioning Contractors National Association Inc.
TC	Transport Canada
TPIC	Truss Plate Institute of Canada
UL	Underwriters Laboratories Inc.
ULC	Underwriters' Laboratories of Canada
WEF	World Environment Federation

O. Reg. 350/06, Division B, Part 1.

PART 2

(Reserved)

PART 3
FIRE PROTECTION, OCCUPANT SAFETY AND ACCESSIBILITY

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Section 3.1. General

3.1.1. Scope

3.1.1.1. Scope

(1) The scope of this Part shall be as described in Subsection 1.1.2. of Division A.

3.1.1.2. Reserved

3.1.1.3. Radon

(1) In addition to all other requirements, a *building* in the following designated areas shall be designed and constructed so that the annual average concentration of radon 222 does not exceed 250 millibecquerels per litre of air and the annual average concentration of the short lived daughters of radon 222 does not exceed 0.02 working levels inside the *building*:

(a) The Town of Elliot Lake in the Territorial District of Algoma,

(b) The Township of Faraday in the County of Hastings, and

(c) The geographic Township of Hyman in the Territorial District of Sudbury.

3.1.1.4. Building in Flood Plains

(1) *Buildings* constructed on flood plains shall,

(a) be designed and constructed in accordance with good engineering practice to withstand anticipated vertical and horizontal hydrostatic pressures acting on the structure, and

(b) incorporate floodproofing measures that will preserve the integrity of *exits* and *means of egress* during times of flooding.

3.1.2. Classification of Buildings or Parts of Buildings by Major Occupancy

3.1.2.1. Classification of Buildings

(1) Except as permitted by Articles 3.1.2.3. to 3.1.2.6., every *building* or part of it shall be classified according to its *major occupancy* as belonging to one of the Groups or Divisions described in Table 3.1.2.1.

(2) A *building* intended for use by more than one *major occupancy* shall be classified according to all *major occupancies* for which it is used or intended to be used.

3.1.2.2. Occupancies of the Same Classification

(1) Any *building* is deemed to be occupied by a single *major occupancy*, notwithstanding its use for more than one *major occupancy*, provided that all *occupancies* are classified as belonging to the same Group classification or, where the Group is divided into Divisions, as belonging to the same Division classification described in Table 3.1.2.1.

Table 3.1.2.1.
Major Occupancy Classification

Forming Part of Sentence 3.1.2.1.(1)

COLUMN 1	COLUMN 2	COLUMN 3
Group	Division	Description of *Major Occupancies*
A	1	*Assembly occupancies* intended for the production and viewing of the performing arts
A	2	*Assembly occupancies* not elsewhere classified in Group A
A	3	*Assembly occupancies* of the arena type
A	4	*Assembly occupancies* in which occupants are gathered in the open air
B	1	Detention occupancies
B	2	Care and treatment occupancies
B	3	Care occupancies
C	---	Residential occupancies
D	---	Business and personal services occupancies
E	---	Mercantile occupancies
F	1	High hazard industrial occupancies
F	2	Medium hazard industrial occupancies
F	3	Low hazard industrial occupancies

3.1.2.3. Arena Type Buildings

(1) An arena type *building* intended for occasional use for trade shows and similar exhibition purposes shall be classified as Group A, Division 3 *occupancy*.

3.1.2.4. Police Stations

(1) A police station with detention quarters is permitted to be classified as a Group B, Division 2 *major occupancy* provided the station is not more than 1 *storey* in *building height* and 600 m^2 in *building area*.

3.1.2.5. Group B, Division 3 Occupancies

(1) Group B, Division 3 *occupancies* are permitted to be classified as Group C *major occupancies* provided,

(a) the occupants live as a single housekeeping unit in a *suite* with sleeping accommodation for not more than 10 persons, and

(b) not more than 2 occupants require assistance in evacuation in case of an emergency.

3.1.2.6. Restaurants

(1) A restaurant is permitted to be classified as a Group E *major occupancy* provided the restaurant is designed to accommodate not more than 30 persons consuming food or drink.

3.1.3. Multiple Occupancy Requirements

3.1.3.1. Separation of Major Occupancies

(1) Except as permitted by Sentences (2) and (3), *major occupancies* shall be separated from adjoining *major occupancies* by *fire separations* having *fire-resistance ratings* conforming to Table 3.1.3.1.

Table 3.1.3.1.
Major Occupancy Fire Separations(1)

Forming Part of Sentence 3.1.3.1.(1)

COLUMN 1	COL. 2	COL. 3	COL. 4	COL. 5	COL. 6	COL. 7	COL. 8	COL. 9	COL. 10	COL. 11	COL. 12	COL. 13	COL. 14
Major Occupancy	Minimum *Fire-Resistance Rating* of *Fire Separation*, h (1)												
	Adjoining *Major Occupancy*												
	A-1	A-2	A-3	A-4	B-1	B-2	B-3	C	D	E	F-1	F-2	F-3
A-1	---	1	1	1	2	2	2	1	1	2	(2)	2	1
A-2	1	---	1	1	2	2	2	1	1	2	(2)	2	1
A-3	1	1	---	1	2	2	2	1	1	2	(2)	2	1
A-4	1	1	1	---	2	2	2	1	1	2	(2)	2	1
B-1	2	2	2	2	---	2	2	2	2	2	(2)	2	2
B-2	2	2	2	2	2	---	1	2	2	2	(2)	2	2
B-3	2	2	2	2	2	1	---	2	2	2	(2)	2	2
C	1	1	1	1	2	2	2	---	1	2(3)	(2)	2(4)	1
D	1	1	1	1	2	2	2	1	---	---	3	---	---
E	2	2	2	2	2	2	2	2(3)	---	---	3	---	---
F-1	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	3	3	---	2	2
F-2	2	2	2	2	2	2	2	2(4)	---	---	2	---	---
F-3	1	1	1	1	2	2	2	1	---	---	2	---	---

Notes to Table 3.1.3.1.:

(1) Section 3.3. contains requirements for the separation of *occupancies* and tenancies that are in addition to the requirements for the separation of *major occupancies*.

(2) See Sentence 3.1.3.2.(1).

(3) See Sentence 3.1.3.1.(2).

(4) See Sentence 3.1.3.2.(2).

(2) In a *building* not more than 3 *storeys* in *building height*, if not more than 2 *dwelling units* are contained together with a Group E *major occupancy*, the *fire-resistance rating* of the *fire separation* between the 2 *major occupancies* need not be more than 1 h.

(3) The *fire separations* required between *major occupancies* in Sentence (1) are permitted to be penetrated by floor openings protected in conformance with Subsection 3.2.8., except for *fire separations* for Group F, Division 1 *major occupancies* and for *mezzanines* described in Sentence 3.2.8.2.(1).

3.1.3.2. Prohibition of Occupancy Combinations

(1) No *major occupancy* of Group F, Division 1 shall be contained within a *building* with any *occupancy* classified as Group A, B or C.

(2) Except as provided in Sentence (4) and Sentence 3.10.2.4.(9), not more than one *suite* of *residential occupancy* shall be contained within a *building* classified as a Group F, Division 2 *major occupancy*.

(3) A sleeping room or sleeping area shall not open directly into a room or area where food is intended to be stored, prepared, processed, distributed, served, sold or offered for sale.

(4) A Group F, Division 2 *major occupancy* is permitted in a *building* containing only *live/work units* and is for the exclusive use of the occupants of the *live/work units*.

3.1.4. Combustible Construction

3.1.4.1. Combustible Materials Permitted

(1) A *building* permitted to be of *combustible construction* is permitted to be constructed of *combustible materials*, with or without *noncombustible* components.

3.1.4.2. Protection of Foamed Plastics

(1) Foamed plastics that form part of a wall or ceiling assembly in *combustible construction* shall be protected from adjacent spaces in the *building*, other than adjacent concealed spaces within *attic or roof spaces*, crawl spaces, and wall assemblies,

(a) by one of the interior finishes described in Subsections 9.29.4. to 9.29.9.,

(b) by any thermal barrier that meets the requirements of Sentence 3.1.5.12.(2), or

(c) where the *building* does not contain a Group B or Group C *major occupancy*, by sheet metal,

  (i) mechanically fastened to the supporting assembly independent of the insulation,

  (ii) not less than 0.38 mm thick, and

  (iii) with a melting point not below 650°C.

(2) The *flame-spread rating* on any exposed surface of *combustible* insulation, or any surface that would be exposed by cutting through it in any direction, shall be not more than 500.

3.1.4.3. Wires and Cables

(1) Optical fibre cables and electrical wires and cables installed in a *building* permitted to be of *combustible construction* shall,

(a) not convey flame or continue to burn for more than 1 min when tested in conformance with the Vertical Flame Test in Clause 4.11.1. of CAN/CSA-C22.2 No. 0.3, "Test Methods for Electrical Wires and Cables", or

(b) be located in,

  (i) totally enclosed *noncombustible* raceways,

  (ii) concealed spaces in walls,

  (iii) concrete slabs, or

  (iv) totally enclosed nonmetallic raceways conforming to Article 3.1.5.20.

(2) The requirement in Clause (1)(a) is considered to be met where the wires and cables,

(a) exhibit a vertical char of not more than 1.5 m when tested in conformance with the Vertical Flame Test – Cables in Cabletrough in Clause 4.11.4. of CSA C22.2 No. 0.3, "Test Methods for Electrical Wires and Cables" (FT4 Rating), or

(b) exhibit a flame-spread of not more than 1.5 m, a smoke density of not more than 0.5 at peak optical density and a smoke density not more than 0.15 at average optical density when tested in conformance with the Flame and Smoke Test in the Appendix to CSA C22.2 No. 0.3, "Test Methods for Electrical Wires and Cables" (FT6 Rating).

(3) Service-entrance cables for communication and community antennae distribution systems need not conform to Sentence (1) provided,

(a) the service-entrance cables are located in a *building* permitted to be of *combustible construction* and are not more than 3 m in length from the point of entry into the *building* or from the point of leaving protection as required in Clause (1)(b), or

(b) the service entrance cables enter into an electrical or telephone *service room* separated from the remainder of the *building* by a *fire separation* having a *fire-resistance rating* not less than 1 h.

3.1.4.4. Fire-Retardant Treated Wood

(1) If *fire-retardant treated wood* is specified in this Part, the wood shall,

(a) be pressure impregnated with fire-retardant chemicals in conformance with CAN/CSA-O80 Series-M, "Wood Preservation", and

(b) have a *flame-spread rating* not more than 25.

3.1.4.5. Heavy Timber Construction Alternative

(1) If *combustible construction* is permitted and is not required to have a *fire-resistance rating* more than 45 min, *heavy timber construction* is permitted to be used.

(2) If *heavy timber construction* is permitted, it shall conform to Article 3.1.4.6.

3.1.4.6. Heavy Timber Construction

(1) Wood elements in *heavy timber construction* shall be arranged in heavy solid masses and with essentially smooth flat surfaces to avoid thin sections and sharp projections.

(2) Except as permitted by Sentences (3) to (6) and (12), the minimum dimensions of wood elements in *heavy timber construction* shall conform to Table 3.1.4.6.

Table 3.1.4.6.
Heavy Timber Dimensions

Forming Part of Sentence 3.1.4.6.(3)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5
Supported Assembly	Structural Element	Solid Sawn (width × depth), mm × mm	Glued-Laminated (width × depth), mm × mm	Round (diam), mm
Roofs only	Columns	140 × 191	130 × 190	180
	Arches supported on the tops of walls or abutments	89 × 140	80 × 152	---
	Beams, girders and trusses	89 × 140	80 × 152	---
	Arches supported at or near the floor line	140 × 140	130 × 152	---
Floors, floors plus roofs	Columns	191 × 191	175 × 190	200
	Beams, girders, trusses and arches	140 × 241 or 191 × 191	130 × 228 or175 × 190	---

(3) Where splice plates are used at splices of roof arches supported on the tops of walls or abutments, roof trusses, roof beams and roof girders in *heavy timber construction* shall be not less than 64 mm thick.

(4) Floors in *heavy timber construction* shall be of glued-laminated or solid sawn plank not less than,

(a) 64 mm thick, splined or tongued and grooved, or

(b) 38 mm wide and 89 mm deep set on edge and well-spiked together.

(5) Floors in *heavy timber construction* shall be laid,

(a) so that no continuous line of end joints will occur except at points of support, and covered with,

  (i) tongued and grooved flooring not less than 19 mm thick laid cross-wise or diagonally, or

  (ii) tongued and grooved phenolic-bonded plywood, strandboard or waferboard not less than 12.5 mm thick, and

(b) not closer than 15 mm to the walls to provide for expansion, with the gap covered at the top or bottom.

(6) Roofs in *heavy timber construction* shall be of tongued and grooved phenolic-bonded plywood not less than 28 mm thick, or glued-laminated or solid sawn plank that is,

(a) not less than 38 mm thick, splined or tongued and grooved, or

(b) not less than 38 mm wide and 64 mm deep set on edge and laid so that no continuous line of end joints will occur except at the points of support.

(7) Wood columns in *heavy timber construction* shall be continuous or superimposed throughout all *storeys*.

(8) Superimposed wood columns in *heavy timber construction* shall be connected by,

(a) reinforced concrete or metal caps with brackets,

(b) steel or iron caps with pintles and base plates, or

(c) timber splice plates fastened to the columns by metal connectors housed within the contact faces.

(9) Where beams and girders in *heavy timber construction* enter masonry, wall plates, boxes of the self-releasing type or hangers shall be used.

(10) Wood girders and beams in *heavy timber construction* shall be closely fitted to columns, and adjoining ends shall be connected by ties or caps to transfer horizontal loads across the joints.

(11) In *heavy timber construction*, intermediate wood beams used to support a floor shall be supported on top of the girders or on metal hangers into which the ends of the beams are closely fitted.

(12) Roof arches supported on the tops of walls or abutments, roof trusses, roof beams and roof girders in *heavy timber construction* are permitted to be not less than 64 mm wide provided,

(a) where two or more spaced members are used, the intervening spaces are,

  - (i) blocked solidly throughout, or
  - (ii) tightly closed by a continuous wood cover plate not less than 38 mm thick secured to the underside of the members, or

- (b) the space below the roof deck or sheathing is *sprinklered*.

3.1.5. Noncombustible Construction

3.1.5.1. Noncombustible Materials

(1) Except as permitted by Sentences (2) to (4) and Articles 3.1.5.2. to 3.1.5.25., 3.1.13.4. and 3.2.2.16., a *building* or part of a *building* required to be of *noncombustible construction*, shall be constructed with *noncombustible* materials.

(2) Notwithstanding the definition for *noncombustible* materials stated in Article 1.4.1.2. of Division A, a material is permitted to be used in *noncombustible construction* provided that, when tested in accordance with CAN/ULC-S135, "Test Method for the Determination of Combustibility Parameters of Building Materials Using an Oxygen Consumption Calorimeter (Cone Calorimeter)" at a heat flux of 50 kW/m^2,

- (a) its average total heat release is not more than 3 MJ/m^2,
- (b) its average total smoke extinction area is not more than 1.0 m^2, and
- (c) the test duration is extended beyond the time stipulated in the referenced standard until it is clear that there is no further release of heat or smoke.

(3) If a material referred to in Sentence (2), consists of a number of discrete layers and testing reveals that the surface layer or layers protects the underlying layers such that the complete combustion of the underlying layers does not occur, the test shall be repeated by removing the outer layers sequentially until all layers have been exposed during testing, or complete combustion has occurred.

(4) The acceptance criteria for a material tested in accordance with Sentence (3) shall be based on the cumulative emissions from all layers, which must not exceed the criteria stated in Clauses (2)(a) and (2)(b).

3.1.5.2. Minor Combustible Components

(1) The following minor *combustible* components are permitted in a *building* required to be of *noncombustible construction*:

- (a) paint,
- (b) mastics and caulking materials applied to provide flexible seals between the major components of exterior wall construction,
- (c) fire stop materials conforming to Sentence 3.1.9.1.(1) and Article 3.1.11.7.,
- (d) tubing for pneumatic controls provided it has an outside diameter not more than 10 mm,
- (e) adhesives, *vapour barriers* and sheathing papers,
- (f) electrical outlet and junction boxes,
- (g) wood blocking within wall assemblies intended for the attachment of handrails, fixtures, and similar items mounted on the surface of the wall, and
- (h) similar minor components.

3.1.5.3. Combustible Roofing Materials

(1) *Combustible* roof covering that has an A, B, or C classification determined in conformance with Subsection 3.1.15. is permitted on a *building* required to be of *noncombustible construction*.

(2) *Combustible* roof sheathing and roof sheathing supports installed above a concrete deck are permitted on a *building* required to be of *noncombustible construction* provided,

- (a) the concrete deck is not less than 50 mm thick,
- (b) the height of the roof space above the deck is not more than 1 000 mm,
- (c) the roof space is divided into compartments by fire stops in conformance with Article 3.1.11.5.,
- (d) openings through the concrete deck other than for *noncombustible roof drains* and plumbing piping are protected by masonry or concrete shafts,
  - (i) constructed as *fire separations* having a *fire-resistance rating* not less than 1 h, and
  - (ii) extending from the concrete deck to not less than 150 mm above the adjacent roof sheathing,

(e) the perimeter of the roof is protected by a *noncombustible* parapet extending from the concrete deck to not less than 150 mm above the adjacent sheathing, and

(f) except as permitted by Clause (d), the roof space does not contain any *building* services.

(3) *Combustible* cant strips, roof curbs, nailing strips and similar components used in the installation of roofing are permitted on a *building* required to be of *noncombustible construction*.

(4) Wood nailer facings to parapets, not more than 600 mm high, are permitted on a *building* required to be of *noncombustible construction*, if the facings and any roof membranes covering the facings are protected by sheet metal.

3.1.5.4. Combustible Glazing and Skylights

(1) *Combustible* skylight assemblies are permitted in a *building* required to be of *noncombustible construction* if the assemblies have a *flame-spread rating* not more than,

(a) 150 provided the assemblies,

  (i) have an individual area not more than 9 m^2,

  (ii) have an aggregate horizontal projected area of the openings through the ceiling not more than 25% of the area of the ceiling of the room or space in which they are located, and

  (iii) are spaced not less than 2 500 mm from adjacent assemblies and 1 200 mm from required *fire separations*, or

(b) 75 provided the assemblies,

  (i) have an individual area not more than 27 m^2,

  (ii) have an aggregate horizontal projected area of the openings through the ceiling not more than 33% of the area of the ceiling of the room or space in which they are located, and

  (iii) are spaced not less than 1 200 mm from adjacent assemblies and from required *fire separations*.

(2) *Combustible* vertical glazing installed no higher than the second *storey* is permitted in a *building* required to be of *noncombustible construction*.

(3) Except as permitted by Sentence (4), the *combustible* vertical glazing permitted by Sentence (2) shall have a *flame-spread rating* not more than 75.

(4) The *flame-spread rating* of *combustible* glazing in Sentence (2) is permitted to be not more than 150 if the aggregate area of glazing is not more than 25% of the wall area of the *storey* in which it is located, and

(a) the glazing is installed in a *building* not more than 1 *storey* in *building height*,

(b) the glazing in the *first storey* is separated from the glazing in the second *storey* in accordance with the requirements of Article 3.2.3.17. for opening protection, or

(c) sprinklers are installed in,

  (i) any *storey* with *combustible* glazing, and

  (ii) the *storey* immediately above the *storey* with *combustible* glazing.

(5) *Combustible* window sashes and frames are permitted in a *building* required to be of *noncombustible construction* provided,

(a) each window in an exterior wall face is an individual unit separated by *noncombustible* wall *construction* from every other opening in the wall,

(b) windows in exterior walls in contiguous *storeys* are separated by not less than 1 000 mm of *noncombustible construction*, and

(c) the aggregate area of openings in an exterior wall face of a *fire compartment* is not more than 40% of the area of the wall face.

3.1.5.5. Combustible Components for Exterior Walls

(1) Except for an *exposing building face* required to conform to Sentence 3.2.3.7.(1) or Sentence 3.2.3.7.(4), an exterior non-*loadbearing* wall assembly that includes *combustible* components is permitted to be used in a *building* required to be of *noncombustible construction* provided,

(a) the *building* is,

  (i) not more than 3 *storeys* in *building height*, or

  (ii) not more than 6 *storeys* in *building height* if *sprinklered*,

(b) the interior surfaces of the wall assembly are protected by a thermal barrier conforming to Sentence 3.1.5.11.(3), and

(c) the wall assembly satisfies the criteria of Sentences (2) and (3) when subjected to testing in conformance with CAN/ULC-S134, "Fire Test of Exterior Wall Assemblies".

(2) Flaming on or in the wall assembly shall not spread more than 5 m above the opening during the test procedure referenced in Sentence (1).

(3) The heat flux during the flame exposure on a wall assembly shall be not more than 35 kW/m^2 measured 3.5 m above the opening during the test procedure referenced in Sentence (1).

(4) A wall assembly permitted by Sentence (1) that includes *combustible* cladding of *fire-retardant treated wood* shall be tested for fire exposure after the cladding has been subjected to an accelerated weathering test as specified in ASTM D2898, "Accelerated Weathering on Fire-Retardant-Treated Wood for Fire Testing".

(5) The requirements in this Article do not apply where foamed plastic insulation is used in an exterior wall assembly of a *building* and the insulation is protected in conformance with Sentences 3.2.3.8.(1) and (2).

3.1.5.6. Nailing Elements

(1) Wood nailing elements attached directly to or set into a continuous *noncombustible* backing for the attachment of interior finishes, are permitted in a *building* required to be of *noncombustible construction* provided the concealed space created by the wood elements is not more than 50 mm thick.

3.1.5.7. Combustible Millwork

(1) *Combustible* millwork including interior trim, doors and door frames, show windows together with their frames, aprons and backing, handrails, shelves, cabinets and counters is permitted in a *building* required to be of *noncombustible construction.*

3.1.5.8. Combustible Flooring Elements

(1) *Combustible stage* flooring supported on *noncombustible* structural members is permitted in a *building* required to be of *noncombustible construction.*

(2) Wood members more than 50 mm but not more than 375 mm high applied directly to or set into a *noncombustible* floor slab are permitted for the construction of a raised platform in a *building* required to be of *noncombustible construction* provided the concealed spaces are fire stopped in conformance with Sentence 3.1.11.3.(2).

(3) The floor system for the raised platform referred to in Sentence (2) is permitted to include *combustible* subfloor and *combustible* finished flooring.

(4) *Combustible* finished flooring is permitted in a *building* required to be of *noncombustible construction.*

3.1.5.9. Combustible Stairs in Dwelling Units

(1) *Combustible* stairs are permitted in a *dwelling unit* in a *building* required to be of *noncombustible construction.*

3.1.5.10. Combustible Interior Finish

(1) *Combustible* interior finish, including paint, wallpaper, and other interior finishes not more than 1 mm thick, is permitted in a *building* required to be of *noncombustible construction.*

(2) *Combustible* interior wall finishes, other than foamed plastics, are permitted in a *building* required to be of *noncombustible construction* provided they,

(a) are not more than 25 mm thick, and

(b) have a *flame-spread rating* not more than 150 on any exposed surface, or any surface that would be exposed by cutting through the material in any direction.

(3) *Combustible* interior ceiling finishes, other than foamed plastics, are permitted in a *building* required to be of *noncombustible construction* provided they,

(a) are not more than 25 mm thick, except for exposed *fire-retardant treated wood* battens, and

(b) have a *flame-spread rating* not more than 25 on any exposed surface, or on any surface that would be exposed by cutting through the material in any direction, or are of *fire-retardant treated wood,* except that not more than 10% of the ceiling area within each *fire compartment* is permitted to have a *flame-spread rating* not more than 150.

3.1.5.11. Gypsum Board

(1) Gypsum board with a tightly adhering paper covering not more than 1 mm thick is permitted in a *building* required to be of *noncombustible construction* provided the *flame-spread rating* of the surface is not more than 25.

3.1.5.12. Combustible Insulation and its Protection

(1) *Combustible* insulation, other than foamed plastics, is permitted in a *building* required to be of *noncombustible construction* provided that it has a *flame-spread rating* not more than 25 on any exposed surface, or any surface that would be exposed by cutting through the material in any direction, where the insulation is not protected as described in Sentences (3) and (4).

(2) Foamed plastic insulation having a *flame-spread rating* not more than 25 on any exposed surface, or any surface that would be exposed by cutting through the material in any direction, is permitted in a *building* required to be of *noncombustible construction* provided the insulation is protected from adjacent space in the *building*, other than adjacent concealed spaces within wall assemblies, by a thermal barrier consisting of,

(a) not less than 12.7 mm thick gypsum board mechanically fastened to a supporting assembly independent of the insulation,

(b) lath and plaster, mechanically fastened to a supporting assembly independent of the insulation,

(c) masonry,

(d) concrete, or

(e) any thermal barrier that meets the requirements of classification B when tested in conformance with CAN4-S124-M, "Test for the Evaluation of Protective Coverings for Foamed Plastic".

(3) *Combustible* insulation having a *flame-spread rating* more than 25 but not more than 500 on an exposed surface, or any surface that would be exposed by cutting through the material in any direction, is permitted in the exterior walls of a *building* required to be of *noncombustible construction*, provided the insulation is protected from adjacent space in the *building*, other than adjacent concealed spaces within wall assemblies, by a thermal barrier as described in Sentence (2), except that in a *building* that is not *sprinklered* and is more than 18 m high, measured between *grade* and the floor level of the top *storey*, or in a *building* that is not *sprinklered* and is regulated by the provisions of Subsection 3.2.6., the insulation shall be protected by a thermal barrier consisting of,

(a) gypsum board not less than 12.7 mm thick, mechanically fastened to a supporting assembly independent of the insulation and with all joints either backed or taped and filled,

(b) lath and plaster, mechanically fastened to a supporting assembly independent of the insulation,

(c) masonry or concrete not less than 25 mm thick, or

(d) any thermal barrier that, when tested in conformance with CAN/ULC-S101-M, "Fire Endurance Tests of Building Construction and Materials", will not develop an average temperature rise more than 140°C or a maximum temperature rise more than 180°C at any point on its unexposed face within 10 min.

(4) *Combustible* insulation having a *flame-spread rating* more than 25 but not more than 500 on any exposed surface, or any surface that would be exposed by cutting through the material in any direction, is permitted in the interior walls, within ceilings and within roof assemblies of a *building* required to be of *noncombustible construction*, provided the insulation is protected from adjacent space in the *building*, other than adjacent concealed spaces within wall assemblies, by a thermal barrier as described in Sentence (2), except that in a *building* that is not *sprinklered* and is more than 18 m high, measured between *grade* and the floor level of the top *storey*, or in a *building* that is not *sprinklered* and is regulated by the provisions of Subsection 3.2.6., the insulation shall be protected by a thermal barrier consisting of,

(a) Type X gypsum board not less than 15.9 mm thick, mechanically fastened to a supporting assembly independent of the insulation and with all joints either backed or taped and filled, conforming to,

  (i) CAN/CSA-A82.27-M, "Gypsum Board",

  (ii) ASTM C36 / C36M, "Gypsum Wallboard",

  (iii) ASTM C442 / C422M, "Gypsum Backing Board, Gyspum Coreboard, and Gypsum Shaftliner Board",

  (iv) ASTM C588 / C588M, "Gypsum Base for Veneer Plasters",

  (v) ASTM C630 / C630M, "Water-Resistant Gypsum Backing Board",

  (vi) ASTM C931 / C931M, "Exterior Gypsum Soffit Board", or

  (vii) ASTM C960 / C960M, "Predecorated Gypsum Board",

(b) non-*loadbearing* masonry or concrete not less than 50 mm thick,

(c) *loadbearing* masonry or concrete not less than 75 mm thick, or

(d) any thermal barrier that, when tested in conformance with CAN/ULC-S101-M, "Fire Endurance Tests of Building Construction and Materials",

  (i) will not develop an average temperature rise more than 140°C or a maximum temperature rise more than 180°C at any point on its unexposed face within 20 min, and

  (ii) will remain in place for not less than 40 min.

(5) *Combustible* insulation, including foamed plastics, installed above roof decks, outside of *foundation walls* below ground level and beneath concrete slabs-on-ground is permitted to be used in a *building* required to be of *noncombustible construction*.

(6) Thermosetting foamed plastic insulation having a *flame-spread rating* not more than 500 that forms part of a factory-assembled exterior wall panel that does not incorporate an air space is permitted to be used in a *building* required to be of *noncombustible construction* provided,

(a) the foamed plastic is protected on both sides by sheet steel not less than 0.38 mm thick that will remain in place for not less than 10 min when the wall panel is tested in conformance with CAN/ULC-S101-M, "Fire Endurance Tests of Building Construction and Materials",

(b) the *flame-spread rating* of the wall panel, determined by subjecting a sample including an assembled joint to the appropriate test described in Subsection 3.1.12., is not more than the *flame-spread rating* permitted for the room or space that it bounds,

(c) the *building* does not contain a Group B or Group C *major occupancy*, and

(d) the *building* is not more than 18 m high, measured between *grade* and the floor level of the top *storey*.

(7) A factory-assembled non-*loadbearing* interior or exterior wall or ceiling panel containing foamed plastic insulation having a *flame-spread rating* of not more than 500 is permitted to be used in a *building* required to be of *noncombustible construction* provided,

(a) the *building* is *sprinklered*,

(b) the *building* is not more than 18 m high, measured between *grade* and the floor level of the uppermost *storey*,

(c) the *building* does not contain a Group A, Group B, or Group C *major occupancy*,

(d) the panel does not contain an air space,

(e) the panel, when tested in conformance with ULC/ORD-C376, "Fire Growth of Foamed Plastic Insulated Building Panels in a Full-Scale Room Configuration", meets the criteria defined in the document, and

(f) the *flame-spread rating* of a panel, determined by subjecting a sample, including an assembled joint typical of field installation, to the appropriate test described in Subsection 3.1.12., is not more than the *flame-spread rating* permitted for the room or space that it bounds.

3.1.5.13. Combustible Elements in Partitions

(1) Except as permitted by Sentence (2), solid lumber *partitions* not less than 38 mm thick and wood framing in *partitions* located in a *fire compartment* not more than 600 m^2 in area are permitted to be used in a *building* required to be of *noncombustible construction* in a *floor area* that is not *sprinklered* provided the *partitions*,

(a) are not required *fire separations*, and

(b) are not located in a *care or detention occupancy*.

(2) *Partitions* installed in a *building* of *noncombustible construction* are permitted to contain wood framing provided,

(a) the *building* is not more than 3 *storeys* in *building height*,

(b) the *partitions* are not located in a *care or detention occupancy*, and

(c) the *partitions* are not installed as enclosures for *exits* or *vertical service spaces*.

(3) Solid lumber *partitions* not less than 38 mm thick and *partitions* that contain wood framing are permitted to be used in a *building* required to be of *noncombustible construction* provided,

(a) the *floor area* containing the *partitions* is *sprinklered*, and

(b) the *partitions* are not,

  (i) located in a *care or detention occupancy*,

  (ii) installed as enclosures for *exits* or *vertical service spaces*, or

  (iii) used to satisfy the requirements of Clause 3.2.8.1.(1)(a).

3.1.5.14. Storage Lockers in Residential Buildings

(1) Storage lockers in storage rooms are permitted to be constructed of wood in a *building* of *residential occupancy* required to be of *noncombustible construction*.

3.1.5.15. Combustible Ducts

(1) Except as required by Sentence 3.6.4.3.(1), *combustible* ducts, including *plenums* and duct connectors, are permitted to be used in a *building* required to be of *noncombustible construction* provided these ducts and duct connectors are used only in horizontal runs.

(2) *Combustible* duct linings, duct coverings, duct insulation, vibration isolation connectors, duct tape, pipe insulation and pipe coverings are permitted to be used in a *building* required to be of *noncombustible construction* provided they conform to the appropriate requirements of Part 6.

(3) In a *building* required to be of *noncombustible construction*, *combustible* ducts need not comply with the requirements of Part 6 provided the ducts are,

(a) part of a duct system conveying only ventilation air, and

(b) contained entirely within a *dwelling unit*.

3.1.5.16. Combustible Piping Materials

(1) Except as permitted by Clause 3.1.5.2.(1)(d) , Sentences (2) and (3), and Article 3.1.5.22., *combustible* piping and tubing and associated adhesives are permitted to be used in a *building* required to be of *noncombustible construction* provided that, except when concealed in a wall or concrete floor slab, they,

(a) have a *flame-spread rating* not more than 25, and

(b) if used in a *building* described in Subsection 3.2.6., have a smoke developed classification not more than 50.

(2) *Combustible* sprinkler piping is permitted to be used within a *sprinklered floor area* in a *building* required to be of *noncombustible construction*.

(3) Polypropylene pipes and fittings are permitted to be used for drain, waste and vent piping for the conveyance of highly corrosive materials and for piping used to distribute distilled or dialyzed water in laboratory and hospital facilities in a *building* required to be of *noncombustible construction*, provided,

(a) the *building* is *sprinklered*,

(b) the piping is not located in a vertical shaft, and

(c) piping that penetrates a *fire separation* is sealed at the penetration by a fire stop system that, when subjected to the fire test method in CAN4-S115-M, "Fire Tests of Firestop Systems", has an FT rating not less than the *fire-resistance rating* of the *fire separation*.

3.1.5.17. Combustible Plumbing Fixtures

(1) *Combustible plumbing fixtures* are permitted in a *building* required to be of *noncombustible construction* if they are constructed of material having a *flame-spread rating* and smoke developed classification permitted in Subsection 3.1.13.

3.1.5.18. Wires and Cables

(1) Except as permitted by Articles 3.1.5.19. and 3.1.5.21., optical fibre cables and electrical wires and cables with *combustible* insulation, jackets or sheathes are permitted in a *building* required to be of *noncombustible construction*, provided,

(a) the wires and cables exhibit a vertical char of not more than 1.5 m when tested in conformance with the Vertical Flame Test – Cables in Cabletrough in Clause 4.11.4. of CAN/CSA-C22.2 No. 0.3, "Test Methods for Electrical Wires and Cables" (FT4 Rating),

(b) the wires and cables are located in,

  (i) totally enclosed *noncombustible* raceways,

  (ii) concealed spaces in walls,

  (iii) concrete slabs,

  (iv) a *service room* separated from the remainder of the *building* by a *fire separation* having a *fire-resistance rating* not less than 1 h, or

  (v) totally enclosed nonmetallic raceways conforming to Article 3.1.5.20., or

(c) the wires and cables are communication cables used at the service entry to a *building* and are not more than 3 m long.

(2) The requirement in Clause (1)(a) is considered to be met where the wires and cables exhibit a flame-spread of not more than 1.5 m, a smoke density of not more than 0.5 at peak optical density and a smoke density not more than 0.15 at average optical density when tested in conformance with the Flame and Smoke Test in the Appendix to CSA C22.2 No. 0.3, "Test Methods for Electrical Wires and Cables" (FT6 Rating).

3.1.5.19. Combustible Travelling Cables for Elevators

(1) *Combustible* travelling cables are permitted on elevating devices in a *building* required to be of *noncombustible construction*.

3.1.5.20. Nonmetallic Raceways

(1) Subject to limits on size for penetrations of *fire separations* as required by Sentence 3.1.9.3.(2), within a *fire compartment* of a *building* required to be of *noncombustible construction*, totally enclosed nonmetallic raceways not more than 175 mm in outside diameter, or an equivalent rectangular area, are permitted to be used to enclose optical fibre cables and electrical wires and cables, provided the raceways exhibit a vertical char not more than 1.5 m when tested in conformance with the Test for Flame Propagation (Riser) in Section 3.4 of the ULC/ORD-C2024, "Fire Tests for Optical Fibre Cable Raceways" (FT-4 rating).

3.1.5.21. Wires in Computer Room Floors

(1) Optical fibre cables and electrical wires and cables with *combustible* insulation, jackets or sheathes, located in the space below a raised floor in a *computer room*, are permitted in a *building* required to be of *noncombustible construction* provided they do not convey flame or continue to burn for more than 1 min when tested in conformance with the Vertical Flame Test in Clause 4.11.1. of CSA C22.2 No. 0.3, "Test Methods for Electrical Wires and Cables" (FT1 Rating).

(2) The requirement in Sentence (1) is considered to be met where the wires and cables

(a) exhibit a vertical char of not more than 1.5 m when tested in conformance with the Vertical Flame Test — Cables in Cabletrough in Clause 4.11.4. of CSA C22.2 No. 0.3, "Test Methods for Electrical Wires and Cables" (FT4 Rating), or

(b) exhibit a flame-spread of not more than 1.5 m, a smoke density of not more than 0.5 at peak optical density and a smoke density not more than 0.15 at average optical density when tested in conformance with the Flame and Smoke Test in the Appendix to CSA C22.2 No. 0.3, "Test Methods for Electrical Wires and Cables" (FT6 Rating).

3.1.5.22. Combustible Components in Public Pools and Public Spas

(1) *Combustible* fittings and components in a *public pool* or *public spa*, including main drains, piping, skimmers, return inlets, steps, ladder rungs and liners, are permitted in a *building* required to be of *noncombustible construction*.

3.1.5.23. Marquees Having Combustible Elements

(1) Except as permitted in Sentence (2), exterior *marquees*, not greater than 7.5 m from ground level to the top of the *marquee*, having *combustible* elements other than fabrics or films conforming to Sentence 3.1.16. 1.(1), are permitted on a *building* required to be of *noncombustible construction*, provided every opening in the exposed wall of the *building* above the *marquee* is protected with wired glass in accordance with Supplementary Standard SB-2 where these openings are within,

(a) 4.5 m horizontally of the *marquee*, and

(b) 9 m vertically above the *marquee*.

(2) The protection required by Sentence (1) is permitted to be waived if the *building* is *sprinklered*.

3.1.5.24. Combustible Mezzanines

(1) In a *building* required to be of *noncombustible construction*, a *mezzanine* located within a *live/work unit* is permitted to be of *combustible construction* provided the area of the *mezzanine* is not more than 25% of the *floor area* of the *live/work unit* or 20 m^2, whichever is less, and has no obstructions more than 1 070 mm above the floor.

3.1.5.25. Wood Decorative Cladding

(1) Wood decorative cladding is permitted to be used on exterior *marquee* fascias, of a *storey* having direct access to a *street* or access route, of a *building* required to be of *noncombustible construction* provided the cladding is *fire-retardant treated wood* that, before testing to CAN/ULC-S102-M, "Test for Surface Burning Characteristics of Building Materials and Assemblies," has been conditioned in conformance with ASTM D 2898, "Accelerated Weathering of Fire-Retardant Treated Wood for Fire Testing".

3.1.5.26. Combustible Solar Collector Systems

(1) A *combustible* solar collector system is permitted to be installed above the roof of a *building* required to be of *noncombustible construction*.

3.1.6. Reserved

3.1.7. Fire-Resistance Ratings

3.1.7.1. Determination of Ratings

(1) Except as permitted by Sentence (2) and Article 3.1.7.2., the rating of a material, assembly of materials or a structural member that is required to have a *fire-resistance rating*, shall be determined on the basis of the results of tests conducted in conformance with CAN/ULC-S101-M, "Fire Endurance Tests of Building Construction and Materials".

(2) A material, assembly of materials or a structural member is permitted to be assigned a *fire-resistance rating* on the basis of Supplementary Standard SB-2.

3.1.7.2. Exception for Exterior Walls

(1) The limit on the rise of temperature on the unexposed surface of an assembly as required by the tests referred to in Sentence 3.1.7.1.(1) shall not apply to an exterior wall that has a *limiting distance* of 1.2 m or more, provided correction is made for radiation from the unexposed surface in accordance with Sentence 3.2.3.1.(6).

3.1.7.3. Exposure Conditions for Rating

(1) Floor, roof and ceiling assemblies shall be rated for exposure to fire on the underside.

(2) *Firewalls* and interior vertical *fire separations* shall be rated for exposure to fire on each side.

(3) Exterior walls shall be rated for exposure to fire from inside the *building*.

3.1.7.4. Minimum Fire-Resistance Rating

(1) The use of materials or assemblies having a greater *fire-resistance rating* than required shall impose no obligation to exceed in whole or in part the minimum *fire-resistance ratings* required by this Part.

3.1.7.5. Rating of Supporting Construction

(1) Except as permitted by Sentence (2) and by Articles 3.2.2.20. to 3.2.2.83. for mixed types of construction, all *loadbearing* walls, columns and arches in the *storey* immediately below a floor or roof assembly required to have a *fire-resistance rating* shall have a *fire-resistance rating* not less than that required for the supported floor or roof assembly.

(2) *Loadbearing* walls, columns and arches supporting a *service room* or *service space* need not conform to Sentence (1).

(3) If an assembly is required to be of *noncombustible construction* and have a *fire-resistance rating*, it shall be supported by *noncombustible construction*.

3.1.8. Fire Separations and Closures

3.1.8.1. General Requirements

(1) Any wall, *partition* or floor assembly required to be a *fire separation* shall,

(a) except as permitted by Sentence (2), be constructed as a continuous element, and

(b) as required in this Part, have a *fire-resistance rating* as specified.

(2) Openings in a *fire separation* shall be protected with *closures*, shafts or other means in conformance with Articles 3.1.8.4. to 3.1.8.18. and Subsections 3.1.9. and 3.2.8.

3.1.8.2. Combustible Construction Support

(1) *Combustible construction* that abuts on or is supported by a *noncombustible fire separation* shall be constructed so that its collapse under fire conditions will not cause the collapse of the *fire separation*.

3.1.8.3. Continuity of Fire Separations

(1) Except as permitted by Sentence 3.6.4.2.(2), a *horizontal service space* or other concealed space located above a required vertical *fire separation*, including the walls of a vertical shaft, shall be divided at the *fire separation* by an equivalent *fire separation* within the *service space*.

(2) The *fire separation* required by Sentence (1) shall terminate so that smoke-tight joints are provided where it abuts on or intersects,

(a) a floor,

(b) a roof slab, or

(c) a roof deck.

(3) Except as required by Subsection 3.6.3. for a shaft penetrating a roof assembly, a shaft, including an *exit* enclosure, that penetrates a *fire separation*, shall,

(a) extend through any *horizontal service space* or any other concealed space, and

(b) terminate so that smoke-tight joints are provided where the shaft abuts on or intersects,

(i) a floor,

(ii) a roof slab, or

(iii) a roof deck.

(4) The continuity of a *fire separation* shall be maintained where it abuts another *fire separation*, a floor, a ceiling, or an exterior wall assembly.

3.1.8.4. Determination of Ratings

(1) Except as permitted by Sentences (2) and 3.1.8.14.(1), the *fire-protection rating* for a *closure* shall be determined on the basis of the results of tests conducted in conformance with the appropriate provisions in,

(a) CAN4-S104-M, "Fire Tests of Door Assemblies",

(b) CAN4-S106-M, " Fire Tests of Window and Glass Block Assemblies", or

(c) CAN/ULC-S112-M, "Fire Test of Fire-Damper Assemblies".

(2) Except as permitted by Sentence 3.1.8.10.(1), the *fire-protection rating* of a *closure* shall conform to Table 3.1.8.4. for the required *fire-resistance rating* of the *fire separation*.

Table 3.1.8.4.
Fire-Protection Rating of Closure

Forming Part of Sentence 3.1.8.4.(2)

COLUMN 1	COLUMN 2
Fire-Resistance Rating of *Fire Separation*	Required *Fire-Protection Rating* of *Closure*
30 min	20 min
45 min	45 min
1 h	45 min
1.5 h	1 h
2 h	1.5 h
3 h	2 h
4 h	3 h

3.1.8.5. Installation of Closures

(1) Except where *fire dampers*, window assemblies and glass block are used as *closures*, *closures* of the same *fire-protection rating* installed on opposite sides of the same opening are deemed to have a *fire-protection rating* equal to the sum of the *fire-protection ratings* of the *closures*.

(2) Except as otherwise specified in this Part, every door, window assembly or glass block used as a *closure* in a required *fire separation*,

(a) shall be installed in conformance with NFPA 80, "Standard for Fire Doors and Fire Windows", and

(b) where required to have a *fire-protection rating*, shall have labels or classification marks to identify the testing laboratory.

(3) If a door is installed so that it could damage the integrity of a *fire separation* if its swing is unrestricted, door stops shall be installed to prevent the damage.

3.1.8.6. Maximum Openings

(1) The size of an opening in an interior *fire separation* required to be protected with a *closure* shall be not more than 11 m^2, with no dimension more than 3.7 m, if a *fire compartment* on either side of the *fire separation* is not *sprinklered*.

(2) The size of an opening in an interior *fire separation* required to be protected with a *closure* shall be not more than 22 m^2, with no dimension more than 6 m, provided the *fire compartments* on both sides of the *fire separation* are *sprinklered*.

3.1.8.7. Fire Dampers

(1) Except as permitted by Article 3.1.8.8., a duct that penetrates an assembly required to be a *fire separation* shall be equipped with a *fire damper*.

3.1.8.8. Fire Dampers Waived

(1) *Fire dampers* need not be provided in *noncombustible* branch ducts that have a melting point above 760°C and that penetrate a required *fire separation* provided the ducts,

(a) serve only *air-conditioning* units or combined *air-conditioning* and heating units discharging air not more than 1 200 mm above the floor and have a cross-sectional area not more than 0.013 m^2, or

(b) are connected to *exhaust duct* risers that are under negative pressure and in which the air flow is upward as required by Article 3.6.3.4. and are carried up inside the riser not less than 500 mm.

(2) A continuous *noncombustible* duct penetrating a vertical *fire separation* not required to have a *fire-resistance rating* need not be equipped with a *fire damper* at the *fire separation*.

(3) A *noncombustible* duct that penetrates a horizontal *fire separation* not required to have a *fire-resistance rating* need not be equipped with a *fire damper* at the *fire separation*.

(4) A *noncombustible* duct that penetrates a *fire separation* that separates a *vertical service space* from the remainder of the *building* need not be equipped with a *fire damper* at the *fire separation* provided,

(a) the duct has a melting point above 760°C, and

(b) each individual duct exhausts directly to the outside at the top of the *vertical service space*.

(5) A continuous *noncombustible* duct having a melting point above 760°C that penetrates a vertical *fire separation* as required by Sentence 3.3.1.1.(1) between *suites* of other than *residential* or *care or detention occupancy* need not be equipped with a *fire damper* at the *fire separation*.

(6) A duct that serves commercial cooking equipment and penetrates a required *fire separation* need not be equipped with a *fire damper* at the *fire separation*.

(7) In elementary and secondary schools, a continuous *noncombustible* duct having a melting point above 760°C that pierces a *fire separation* having a *fire-resistance rating* of 30 min need not be equipped with a *fire damper* at the *fire separation*.

(8) In a Group B, Division 3 *occupancy* that contains sleeping accommodation for not more than 10 persons and not more than 6 occupants require assistance in evacuation in case of an emergency and which is equipped with a fire-alarm system, a duct need not be provided with a *fire-damper* at a *fire separation* provided duct-type *smoke detectors* have been installed to control smoke circulation as described in Article 3.2.4.12.

3.1.8.9. Installation of Fire Dampers

(1) A *fire damper* shall be arranged to close automatically upon the operation of a fusible link conforming to ULC-S505, "Fusible Links for Fire Protection Service", or other heat-actuated or smoke-actuated device.

(2) A heat-actuated device referred to in Sentence (1) shall,

(a) be located where it is readily affected by an abnormal rise of temperature in the duct, and

(b) have a temperature rating approximately 30°C above the maximum temperature that would exist in the system either with the system in operation or shut down.

(3) A *fire damper* shall be installed in the plane of the *fire separation* so as to stay in place should the duct be dislodged during a fire.

(4) A *fire damper* tested in the vertical or horizontal position shall be installed in the manner in which it was tested.

(5) A tightly fitted access door shall be installed for each *fire damper* to provide access for the inspection of the damper and the resetting of the release device.

3.1.8.10. Twenty-Minute Closures

(1) A door assembly having a *fire-protection rating* not less than 20 min is permitted to be used as a *closure* in,

(a) a *fire separation* not required to have a *fire-resistance rating* more than 1 h, located between,

(i) a *public corridor* and a *suite*,

(ii) a corridor and adjacent sleeping rooms, or

(iii) a corridor and adjacent classrooms, offices and libraries in Group A, Division 2 major occupancies, or

(b) a *fire separation* not required to have a *fire-resistance rating* more than 45 min, located in a *building* not more than 3 *storeys* in *building height*.

(2) The requirements for *noncombustible* sills and *combustible* floor coverings in NFPA 80, "Fire Doors and Fire Windows", do not apply to a door described in Sentence (1).

(3) A door described in Sentence (1) shall have a clearance not more than 6 mm at the bottom and not more than 3 mm at the sides and top.

(4) In elementary and secondary schools, a door assembly conforming to Articles 9.10.13.2. and 9.10.13.3. is permitted to be used as a *closure* in a *fire separation* having a *fire-resistance rating* of 30 min.

3.1.8.11. Self-Closing Devices

(1) Except as provided in Sentences (2) to (5) and 3.3.3.2.(5), every door in a *fire separation* shall be equipped with a self-closing device designed to return the door to the closed position after each use.

(2) Self-closing devices need not be provided on doors to freight elevators and dumbwaiters.

(3) In a *building* that is not more than 3 *storeys* in *building height*, a self-closing device is not required on a door that is located between a classroom and a corridor providing *access to exit* from the classroom, except that a self-closing device is required on a door between a *hazardous classroom* and the corridor in an elementary or secondary school.

(4) In a *building* that is not more than 3 *storeys* in *building height*, a self-closing device is not required on a door between a *public corridor* and an adjacent room or *suite* of *business and personal services occupancy* if the door is not located in,

(a) a dead-end portion of the corridor, or

(b) a corridor that serves a *hotel*.

(5) Within a *fire compartment* in a hospital or nursing home that complies with the requirements of Article 3.3.3.5., a self-closing device is not required on a door that is located between,

(a) a patient's or resident's sleeping room and a corridor serving the patient's or resident's sleeping room, or

(b) a patient's or resident's sleeping room and an adjacent room that serves the patient's or resident's sleeping room.

3.1.8.12. Hold-Open Devices

(1) A hold-open device is permitted on a door in a required *fire separation*, other than an *exit* door in a *building* more than 3 *storeys* in *building height*, and on a door for a vestibule required by Article 3.3.5.7., provided the device is designed to release the door in conformance with Sentences (2) to (7).

(2) Except as required by Sentences (3), (5), (6) and (7), a hold-open device permitted by Sentence (1) shall be designed to release by a signal from,

(a) an automatic sprinkler system,

(b) a heat-actuated device,

(c) fusible link, or

(d) a *smoke detector* located as described in Appendix B of NFPA 80, "Fire Doors and Fire Windows".

(3) Except as required by Sentences (4), (5), (6) and (7), a hold-open device permitted by Sentence (1) shall be designed to release upon a signal from a *smoke detector* located as described in Appendix B of NFPA 80, "Fire Doors and Fire Windows", if used on,

(a) an *exit* door,

(b) a door opening into a *public corridor*,

(c) an egress door referred to in Sentence 3.4.2.4.(2),

(d) a door serving,

  (i) an *assembly occupancy*,

  (ii) a *care or detention occupancy*, or

  (iii) a *residential occupancy*, or

(e) a door required to function as part of a smoke control system.

(4) Except as required by Sentence (5), (6) and (7), a hold-open device permitted by Sentence (1) shall be designed to release upon a signal from the *building* fire alarm system if a fire alarm system is provided, except that this requirement does not apply to,

(a) a hold-open device on a door located between a corridor used by the public and an adjacent sleeping room in a hospital or nursing home, or

(b) a hold-open device that is designed to release by a heat-actuated device or a fusible link in conformance with Sentence (2).

(5) Sentences (2) and (3) do not apply in a hospital or nursing home to,

(a) a door located between a corridor used by the public and an adjacent sleeping room, or

(b) paired doors described in Sentence 3.3.3.3.(4).

(6) A hold-open device on a door in Clause (5)(a) shall be designed to release the door upon a signal from,

(a) a *smoke detector* as required by Sentence 3.2.4.11.(1) for sleeping rooms in Group B *occupancies*, and

(b) the fire alarm system when an *alert signal* is initiated within the same *fire compartment* in Sentence 3.3.3.5.(2).

(7) A hold-open device on a door in Clause (5)(b) shall be designed to release the door upon a signal from the fire alarm system when an *alert signal* is initiated within the same *fire compartment* in Sentence 3.3.3.5.(2).

(8) A rolling steel fire door installed as a *closure* in a *fire separation* shall be equipped with a hold-open device designed to release the shutter as described in Sentence (2).

3.1.8.13. Door Latches

(1) Except as permitted by Sentence 3.3.3.2.(5) and Article 3.3.3.5., a swing-type door in a *fire separation* shall be equipped with a positive latching mechanism designed to hold the door in the closed position after each use.

3.1.8.14. Wired Glass and Glass Block

(1) Except as permitted by Articles 3.1.8.16. and 3.1.8.17. for the separation of *exits*, an opening in a *fire separation* having a *fire-resistance rating* not more than 1 h is permitted to be protected with fixed wired glass assemblies or glass blocks installed in conformance with NFPA 80, "Fire Doors and Fire Windows".

(2) Wired glass assemblies permitted by Sentence (1) and described in Supplementary Standard SB-2, are permitted to be used as *closures* in vertical *fire separations* without being tested in accordance with Sentence 3.1.8.4.(1).

(3) Glass blocks permitted by Sentence (1) shall be installed in accordance with Subsection 4.3.2. and reinforced with steel reinforcement in each horizontal joint.

3.1.8.15. Temperature Rise Limit for Doors

(1) Except as permitted by Article 3.1.8.17., the maximum temperature rise on the opaque portion of the unexposed side of a door used as a *closure* in a *fire separation* in a location shown in Table 3.1.8.15., shall conform to the Table when tested in conformance with Sentence 3.1.8.4.(1).

3.1.8.16. Area Limits for Wired Glass and Glass Block

(1) Except as permitted by Article 3.1.8.17., the maximum area of wired glass in a door used in the locations shown in Table 3.1.8.15. shall conform to the Table.

(2) Except as permitted by Article 3.1.8.17., the maximum area of glass block and wired glass panels not in a door, used in the locations shown in Table 3.1.8.15., shall conform to the Table.

Table 3.1.8.15.
Restrictions on Temperature Rise and Glazing for Closures

Forming Part Articles of 3.1.8.15. and 3.1.8.16.

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5
Location	Minimum Required *Fire-Protection Rating* of Door	Maximum Temperature Rise on Opaque Portion of Unexposed Side of Door, °C	Maximum Area of Wired Glass in Door, m^2	Maximum Aggregate Area of Glass Block and Wired Glass Panels not in Door, m^2
Between a dead-end corridor and an adjacent *occupancy* where the corridor provides the only *access to exit* and is required to have a *fire-resistance rating*	Less than 45 min	No limit	No limit	No limit
	45 min	250 after 30 min	0.0645	0.0645
Between an *exit* enclosure and the remainder of the *floor area* in *buildings* not more than 3 *storeys* in *building height*	All ratings	No limit	0.8	0.8
Between an *exit* enclosure and the remainder of the *floor area* (except as permitted above)	45 min	250 after 30 min	0.0645	0.0645
	1.5 h	250 after 1 h	0.0645	0.0645
	2 h	250 after 1 h	0.0645	0.0645
In a *firewall*	1.5 h	250 after 30 min	0.0645	0
	3 h	250 after 1 h	0	0

3.1.8.17. Temperature Rise and Area Limits Waived

(1) The temperature rise limits and glass area limits required by Articles 3.1.8.15. and 3.1.8.16. are waived for a *closure* between an *exit* enclosure and an enclosed vestibule or corridor provided,

(a) the vestibule or corridor is separated from the remainder of the *floor area* by a *fire separation* having a *fire-resistance rating* not less than 45 min,

(b) the *fire separation* required by Clause (a) contains no wired glass or glass block within 3 m of the *closure* into the *exit* enclosure, and

(c) the vestibule or corridor contains no *occupancy*.

3.1.8.18. Sprinkler Protected Glazed Wall Assembly

(1) A sprinkler protected glazed wall assembly shall be constructed in accordance with the requirements of ULC/ORD C263.1, "Sprinkler-Protected Windows Systems".

(2) A sprinkler protected glazed wall assembly shall not be installed in,

(a) *fire separations* requiring a *fire resistance rating* of more than 2 hours,

(b) a *firewall*,

(c) a *high hazard industrial occupancy*, or

(d) any part of an *exit* serving,

  (i) a *floor area* subject to the requirements of Subsection 3.2.6.,

  (ii) a *care and detention occupancy*, or

  (iii) a *residential occupancy*.

(3) Where a sprinkler protected glazed wall assembly is installed in an *exit fire separation* permitted in Sentence (2),

(a) the *building* shall be *sprinklered*, and

(b) the *exits* protected with the sprinkler protected glazed wall assemblies shall not comprise more than one half of the required number of *exits* from any *floor area*.

3.1.9. Building Services in Fire Separations and Fire Rated Assemblies

3.1.9.1. Fire Stopping of Service Penetrations

(1) Except as required by Sentence (2), piping, tubing, ducts, *chimneys*, optical fibre cables, electrical wires and cables, totally enclosed *noncombustible* raceways, electrical outlet boxes and other similar *building* services that penetrate a *fire separation* or a membrane forming part of an assembly required to have a *fire-resistance rating*, shall be,

(a) sealed by a fire stop system that, when subjected to the fire test method in ULC-S115, "Fire Tests for Fire Stop Systems", has an F rating not less than the *fire-protection rating* required for *closures* in the *fire separation* in conformance with Table 3.1.8.4., or

(b) tightly fitted.

(2) Piping, tubing, ducts, *chimneys*, optical fibre cables, electrical wires and cables, totally enclosed *noncombustible* raceways, electrical outlet boxes and other similar *building* services that penetrate a *firewall* or a horizontal *fire separation* that is required to have a *fire-resistance rating* in conformance with Article 3.2.1.2., shall be sealed at the penetration by a fire stop system that, when subjected to the fire test method in CAN4-S115-M, "Fire Tests of Firestop Systems", has an FT rating not less than the *fire-resistance rating* for the *fire separation*.

3.1.9.2. Combustibility of Service Penetrations

(1) Except as permitted by Articles 3.1.9.3. and 3.1.9.4., pipes, ducts, electrical outlet boxes, totally enclosed raceways or other similar service equipment that penetrate an assembly required to have a *fire-resistance rating* shall be *noncombustible* unless the assembly has been tested incorporating that service equipment.

3.1.9.3. Penetration by Wires, Cables and Outlet Boxes

(1) Optical fibre cables and electrical wires and cables in totally enclosed *noncombustible* raceways are permitted to penetrate an assembly required to have a *fire-resistance rating* without being incorporated in the assembly at the time of testing as required by Article 3.1.9.2.

(2) Except as permitted by Sentence (3), totally enclosed nonmetallic raceways conforming to Article 3.1.5.20, optical fibre cables, and electrical wires and cables, single or grouped, with *combustible* insulation, jackets or sheathes that conform to the requirements of Clause 3.1.5.18.(1)(a) and that are not installed in totally enclosed *noncombustible* raceways are permitted to penetrate an assembly required to have a *fire-resistance rating* without being incorporated in the assembly at the time of testing as required by Article 3.1.9.2., provided the overall diameter of the single or grouped wires or cables, or the raceways is not more than 25 mm.

(3) Single conductor metal sheathed cables with *combustible* jacketing that are more than 25 mm (1 in) in overall diameter are permitted to penetrate a *fire separation* required to have a *fire-resistance rating* without being incorporated in the assembly at the time of testing as required by Article 3.1.9.2., provided the cables are not grouped.

(4) *Combustible* totally enclosed raceways that are embedded in a concrete floor slab are permitted in an assembly required to have a *fire-resistance rating* without being incorporated in the assembly at the time of testing as required by Article 3.1.9.2., provided the concrete cover between the raceway and the bottom of the slab is not less than 50 mm.

(5) *Combustible* outlet boxes are permitted in an assembly required to have a *fire-resistance rating* without being incorporated in the assembly at the time of testing as required by Article 3.1.9.2., provided the opening through the membrane into the box is not more than 0.016 m^2.

(6) Outlet boxes that penetrate opposite sides of a wall assembly shall be offset where necessary to maintain the integrity of the *fire separation*.

3.1.9.4. Combustible Piping Penetrations

(1) *Combustible* sprinkler piping is permitted to penetrate a *fire separation* provided the *fire compartments* on each side of the *fire separation* are *sprinklered*.

(2) Reserved

(3) Except as permitted by Sentences (4) to (8), *combustible* piping shall not be used if any part of that system penetrates,

(a) a *fire separation* required to have a *fire-resistance rating*, or

(b) a membrane that forms part of an assembly required to have a *fire-resistance rating*.

(4) *Combustible* piping is permitted to penetrate a *fire separation* required to have a *fire-resistance rating* or a membrane that forms part of an assembly required to have a *fire-resistance rating*, provided,

(a) the piping is sealed at the penetration by a fire stop system that has an F rating not less than the *fire-resistance rating* required for the *fire separation* when subjected to the fire test method in CAN4-S115-M, "Fire Tests of Firestop Systems", with a pressure differential of 50 Pa between the exposed and unexposed sides, with the higher pressure on the exposed side, and

(b) the piping is not located in a vertical shaft.

(5) *Combustible* drain piping is permitted to penetrate a horizontal *fire separation* provided it leads directly from a *noncombustible* water closet through a concrete floor slab.

(6) *Combustible* piping is permitted on one side of a vertical *fire separation* provided it is not located in a vertical shaft.

(7) *Combustible* piping is permitted to penetrate a vertical or horizontal *fire separation* provided the *fire compartments* on each side of the *fire separation* are *sprinklered*.

(8) *Combustible* piping not more 25 mm in diameter containing chlorine gas is permitted to penetrate a *fire separation* between a chlorine gas *service room* built in conjunction with a *public pool* or *public spa*, and the remainder of the *building*.

3.1.9.5. Openings through a Membrane Ceiling

(1) A membrane ceiling forming part of an assembly assigned a *fire-resistance rating* on the basis of Supplementary Standard SB-2 is permitted to be penetrated by openings leading into ducts within the ceiling space provided,

(a) the ducts are sheet steel, and

(b) the amount of openings and their protection conform to the requirements of Supplementary Standard SB-2.

(2) *Fire stop flaps* in ceiling membranes required in Sentence (1) shall conform to CAN4-S112.2-M, "Fire Test of Ceiling Firestop Flap Assemblies".

3.1.9.6. Plenums

(1) A ceiling assembly used as a *plenum* shall conform to Article 3.6.4.3.

3.1.10. Firewalls

3.1.10.1. Prevention of Firewall Collapse

(1) Except as permitted by Sentence (2), the connections and supports for structural framing members that are connected to or supported on a *firewall* and have a *fire-resistance rating* less than that required for the *firewall*, shall be designed so that the failure of the framing systems during a fire will not affect the integrity of the *firewall* during the fire.

(2) Sentence (1) does not apply to a *firewall* consisting of two separate wall assemblies each tied to its respective *building* frame but not to each other, provided each wall assembly is,

(a) a *fire separation* having one half of the *fire-resistance rating* required for the *firewall* by Sentences 3.1.10.2.(1) and (2), and

(b) designed so that the collapse of one wall assembly will not cause collapse of the other.

(3) A *firewall* is permitted to be supported on the structural frame of a *building* of *noncombustible construction* provided the supporting frame has a *fire-resistance rating* not less than that required for the *firewall*.

(4) Piping, ducts and totally enclosed *noncombustible* raceways shall be installed so that their collapse will not cause collapse of the *firewall*.

3.1.10.2. Rating of Firewalls

(1) A *firewall* that separates a *building* or *buildings* with *floor areas* containing a Group E or a Group F, Division 1 or 2 *major occupancy* shall be constructed as a *fire separation* of *noncombustible construction* having a *fire-resistance rating* not less than 4 h, except that where the upper portion of a *firewall* separates *floor areas* containing other than Group E or Group F, Division 1 or 2 *major occupancies*, the *fire-resistance rating* of the upper portion of the *firewall* is permitted to be not less than 2 h.

(2) A *firewall* that separates a *building* or *buildings* with *floor areas* containing *major occupancies* other than Group E or Group F, Division 1 or 2 shall be constructed as a *fire separation* of *noncombustible construction* having a *fire-resistance rating* not less than 2 h.

(3) Except as permitted by Sentence (4), the required *fire-resistance rating* of a *firewall*, except for *closures*, shall be provided by masonry or concrete.

(4) A *firewall* permitted to have a *fire-resistance rating* not more than 2 h need not be constructed of masonry or concrete provided,

(a) the assembly providing the *fire-resistance rating* is protected against damage that would compromise the integrity of the assembly,

(b) the design conforms to Article 4.1.5.18.,

(c) the level of performance of the *firewall* is not less than of masonry or concrete in the areas of

 (i) performance during fire conditions,

 (ii) mechanical damage during the normal use of the *building*, and

 (iii) resistance to damage from moisture,

(d) the *firewall* separates *buildings* or *buildings* with *floor areas* that do not contain,

 (i) a Group B, Division 1 *major occupancy*, or

 (ii) a Group B, Division 2 *major occupancy*, and

(e) the *firewall* does not separate *buildings* regulated by the provisions of Subsection 3.2.6.

3.1.10.3. Continuity of Firewalls

(1) A *firewall* shall extend from the ground continuously through, or adjacent to, all *storeys* of a *building* or *buildings* so separated, except that a *firewall* located above a *basement storage garage* conforming to Article 3.2.1.2. is permitted to commence at the floor assembly immediately above the *storage garage*.

(2) A *firewall* is permitted to terminate on the underside of a reinforced concrete roof slab provided,

(a) the roof slab on both sides of the *firewall* has a *fire-resistance rating* not less than,

 (i) 1 h if the *firewall* is required to have a *fire-resistance rating* not less than 2 h, or

 (ii) 2 h if the *firewall* is required to have a *fire-resistance rating* not less than 4 h, and

(b) there are no concealed spaces within the roof slab in that portion immediately above the *firewall*.

3.1.10.4. Parapets

(1) Except as permitted by Sentences (2) and 3.1.10.3.(2), a *firewall* shall extend above the roof surface to form a parapet not less than,

(a) 150 mm high for a *firewall* required to have a *fire-resistance rating* not less than 2 h, and

(b) 900 mm high for a *firewall* required to have a *fire-resistance rating* not less than 4 h.

(2) A *firewall* that separates 2 *buildings* with roofs at different elevations need not extend above the upper roof surface to form a parapet, provided the difference in elevation between the roofs is more than 3 m.

3.1.10.5. Maximum Openings

(1) Openings in a *firewall* shall conform to the size limits described in Article 3.1.8.6. and the aggregate width of openings shall be not more than 25% of the entire length of the *firewall*.

3.1.10.6. Exposure Protection for Adjacent Walls

(1) The requirements of Article 3.2.3.14. shall apply to the external walls of 2 *buildings* that meet at a *firewall* at an angle less than 135°.

3.1.10.7. Combustible Projections

(1) *Combustible* material shall not extend across the end of a *firewall* but is permitted to extend across a roof above a *firewall* that is terminated in conformance with Sentence 3.1.10.3.(2).

(2) If *buildings* are separated by a *firewall*, *combustible* projections on the exterior of one *building*, including balconies, platforms, *canopies*, eave projections and stairs, that extend outward beyond the end of the *firewall*, shall not be permitted within 2 400 mm of *combustible* projections and window or door openings of the adjacent *building*.

3.1.11. Fire Stops in Concealed Spaces

3.1.11.1. Separation of Concealed Spaces

(1) Concealed spaces in interior wall, ceiling and crawl spaces shall be separated from concealed spaces in exterior walls and *attic or roof spaces* by fire stops conforming to Article 3.1.11.7.

3.1.11.2. Fire Stopping in Wall Assemblies

(1) Except as permitted by Sentence (2), fire stops conforming to Article 3.1.11.7. shall be provided to block off concealed spaces within a wall assembly,

(a) at every floor level,

(b) at every ceiling level where the ceiling forms part of an assembly required to have a *fire-resistance rating*, and

(c) so that the maximum horizontal dimension is not more than 20 m and the maximum vertical dimension is not more than 3 m.

(2) Fire stops conforming to Sentence (1) are not required provided,

(a) the wall space is filled with insulation,

(b) the exposed construction materials and any insulation within the wall space are *noncombustible*,

(c) the exposed construction materials and any insulation within the wall space have a *flame-spread rating* not more than 25 on any exposed surface, or on any surface that would be exposed by cutting through the material in any direction, and fire stops are installed so that the vertical distance between them is not more than 10 m, or

(d) the insulated wall assembly contains not more than one concealed air space, and the horizontal thickness of that air space is not more than 25 mm.

3.1.11.3. Fire Stopping between Nailing and Supporting Elements

(1) In a *building* required to be of *noncombustible construction*, a concealed space in which there is an exposed ceiling finish with a *flame-spread rating* more than 25, shall be provided with fire stops conforming to Article 3.1.11.7. between wood nailing elements, so that the maximum area of the concealed space is not more than 2 m^2.

(2) In a *building* required to be of *noncombustible construction*, fire stops conforming to Article 3.1.11.7. shall be provided in the concealed spaces created by the wood members permitted by Sentence 3.1.5.8.(2) so that the maximum area of a concealed space is not more than 10 m^2.

3.1.11.4. Fire Stopping between Vertical and Horizontal Spaces

(1) Fire stops conforming to Article 3.1.11.7. shall be provided,

(a) at all interconnections between concealed vertical and horizontal spaces in interior coved ceilings, drop ceilings and soffits in which the exposed construction materials within the space have a *flame-spread rating* more than 25, and

(b) at the end of each run and at each floor level in concealed spaces between stair stringers in which the exposed construction materials within the space have a *flame-spread rating* more than 25.

3.1.11.5. Fire Stopping of Horizontal Concealed Spaces

(1) Except for a crawl space conforming to Sentence 3.1.11.6.(1), a horizontal concealed space within a floor assembly or roof assembly of *combustible construction*, in which sprinklers are not installed, shall be separated by construction conforming to Article 3.1.11.7. into compartments not more than,

(a) 600 m^2 in area with no dimension more than 60 m if the exposed construction materials within the space have a *flame-spread rating* not more than 25, and

(b) 300 m^2 in area with no dimension more than 20 m if the exposed construction materials within the space have a *flame-spread rating* more than 25.

(2) A concealed space in an exterior cornice, a mansard style roof, a balcony or a *canopy* in which exposed construction materials within the space have a *flame-spread rating* more than 25, shall be separated by construction conforming to Article 3.1.11.7.,

(a) at locations where the concealed space extends across the ends of required vertical *fire separations*, and

(b) so that the maximum dimension in the concealed space is not more than 20 m.

3.1.11.6. Fire Stopping of Crawl Spaces

(1) A crawl space that is not considered as a *basement* by Article 3.2.2.9. and in which sprinklers are not installed, shall be separated by construction conforming to Article 3.1.11.7. into compartments not more than 600 m^2 in area with no dimension more than 30 m.

3.1.11.7. Fire Stop Materials

(1) Except as permitted by Sentences (2) to (4) and (7) materials used to separate concealed spaces into compartments shall remain in place and prevent the passage of flames for not less than 15 min when subjected to the standard fire exposure in CAN/ULC-S101-M, "Fire Endurance Tests of Building Construction and Materials".

(2) Gypsum board not less than 12.7 mm thick and sheet steel not less than 0.38 mm thick need not be tested in conformance with Sentence (1) provided all joints have continuous support.

(3) In a *building* required to be of *noncombustible construction*, wood nailing elements described in Article 3.1.5.6. need not be tested in conformance with Sentence (1).

(4) In a *building* permitted to be of *combustible construction*, in a *combustible* roof system permitted by Sentence 3.1.5.3.(2), and in a raised platform permitted by Sentence 3.1.5.8.(2), materials used to separate concealed spaces into compartments are permitted to be,

(a) solid lumber not less than 38 mm thick,

(b) phenolic bonded plywood, waferboard, or strandboard not less than 12.5 mm thick with joints supported, or

(c) two thicknesses of lumber, each not less than 19 mm thick with joints staggered, where the width or height of the concealed space requires more than one piece of lumber not less than 38 mm thick to block off the space.

(5) Openings through materials referred to in Sentences (1) to (4) shall be protected to maintain the integrity of the construction.

(6) Where materials referred to in Sentences (1) to (4) are penetrated by construction elements or by service equipment, fire stop materials shall be used to seal the penetration.

(7) In a *building* permitted to be of *combustible construction*, semi-rigid fibre insulation board, produced from glass, rock or slag, is permitted to be used to block the vertical space in a double wythe wall assembly formed at the intersection of the floor assembly and the walls, provided the insulation board,

(a) has a density not less than 45 kg/m^3,

(b) is securely fastened to one set of studs,

(c) extends from below the bottom of the top plates in the lower *storey* to above the top of the bottom plate in the upper *storey*, and

(d) completely fills the portion of the vertical space between the headers and between the wall plates.

3.1.12. Flame-Spread Rating and Smoke Developed Classification

3.1.12.1. Determination of Ratings

(1) Except as required by Sentence (2) and as permitted by Sentence (3), the *flame-spread rating* and smoke developed classification of a material, assembly, or structural member shall be determined on the basis of no fewer than three tests conducted in conformance with CAN/ULC-S102-M, "Test for Surface Burning Characteristics of Building Materials and Assemblies".

(2) The *flame-spread rating* and smoke developed classification of a material or assembly shall be determined on the basis of no fewer than three tests conducted in conformance with CAN/ULC-S102.2, "Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies", if the material or assembly,

(a) is designed for use in a relatively horizontal position with only its top surface exposed to air,

(b) cannot be tested in conformance with Sentence (1) without the use of supporting material that is not representative of the intended installation, or

(c) is thermoplastic.

(3) A material, assembly, or structural member is permitted to be assigned a *flame-spread rating* and smoke developed classification on the basis of Supplementary Standard SB-2.

3.1.13. Interior Finish

3.1.13.1. Interior Finish Description

(1) Interior finish material shall include any material that forms part of the interior surface of a floor, wall, *partition* or ceiling, including,

(a) interior cladding of plaster, wood or tile,

(b) surfacing of fabric, paint, plastic, veneer or wallpaper,

(c) doors, windows and trim,

(d) lighting elements, such as light diffusers and lenses forming part of the finished surface of the ceiling, and

(e) carpet material that overlies a floor that is not intended as the finished floor.

3.1.13.2. Flame-Spread Rating

(1) Except as otherwise required or permitted by this Subsection, the *flame-spread rating* of interior wall and ceiling finishes, including glazing and skylights, shall be not more than 150 and shall conform to Table 3.1.13.2.

(2) Except as permitted by Sentence (3), doors, other than those in Group A, Division 1 *occupancies*, need not conform to Sentence (1) provided they have a *flame-spread rating* not more than 200.

(3) Doors within a *dwelling unit* need not conform to Sentences (1) and (2).

(4) Up to 10% of the total wall area and 10% of the total ceiling area of a wall or ceiling finish that is required by Sentence (1) to have a *flame-spread rating* less than 150 is permitted to have a *flame-spread rating* not more than 150, except that up to 25% of the total wall area of lobbies described in Sentence 3.4.4.2.(2) is permitted to have a *flame-spread rating* not more than 150.

(5) Except in the case of Group A, Division 1 *occupancies*, *combustible* doors, skylights, glazing and light diffusers and lenses shall not be considered in the calculation of wall and ceiling areas described in Sentence (4).

Table 3.1.13.2.
Flame-Spread Ratings

Forming Part of Sentence 3.1.13.2.(1)

COLUMN 1	COLUMN 2	COLUMN 3
Occupancy, Location or Element	Maximum *Flame-Spread Rating* for Walls and Ceilings	
	Sprinklered	Not *Sprinklered*
Group A, Division 1 *occupancies*, including doors, skylights, glazing and light diffusers and lenses	150	75
Group B *occupancies*	150	75(2)
Exits(1)	25	25
Lobbies described in Sentence 3.4.4.2.(2)	25	25
Covered vehicular passageways, except for roof assemblies of *heavy timber construction* in such passageways	25	25
Vertical service spaces	25	25

Notes to Table 3.1.13.2.:

(1) See Articles 3.1.13.8. and 3.1.13.10.

(2) Group B *occupancies* are required to be *sprinklered*. See Part 11 for renovations of existing non-*sprinklered* Group B *occupancies*.

3.1.13.3. Bathrooms in Residential Suites

(1) The *flame-spread rating* of interior wall and ceiling finishes for a bathroom in a *suite* of *residential occupancy* shall be not more than 200.

(2) *Plumbing fixtures* shall have a *flame-spread rating* not more than 200.

3.1.13.4. Light Diffusers and Lenses

(1) The *flame-spread rating* of *combustible* light diffusers and lenses in all *occupancies* other than Group A, Division 1 is permitted to be more than the *flame-spread rating* limits required elsewhere in this Subsection, provided the light diffusers and lenses,

(a) have a *flame-spread rating* not more than 250 and a smoke developed classification not more than 600 when tested in conformance with CAN/ULC-S102.2, "Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies",

(b) fall to the bottom of the test apparatus before igniting when tested in conformance with ULC-S102.3-M, "Fire Test of Light Diffusers and Lenses",

(c) are not prevented from falling from the ceiling by construction located beneath the elements, and

(d) are not used in a corridor that is required to be separated from the remainder of the *building* by a *fire separation* or in an *exit* shaft unless individual diffusers or lenses are not more than 1 m^2 in area and are not less than 1 200 mm apart.

3.1.13.5. Skylights

(1) Individual *combustible* skylights in a corridor that is required to be separated from the remainder of the *building* by a *fire separation* shall be not more than 1 m^2 in area and not less than 1 200 mm apart.

3.1.13.6. Corridors

(1) Except as permitted by Sentences (2) and (3), the *flame-spread rating* shall be not more than 75 for the interior wall finish of,

(a) a *public corridor*,

(b) a corridor used by the public in,

  (i) an *assembly occupancy*, or

  (ii) a *care or detention occupancy*,

(c) a corridor serving classrooms, or

(d) a corridor serving sleeping rooms in a *care or detention occupancy*.

(2) The *flame-spread rating* limit specified in Sentence (1) does not apply to corridors referred to in Sentence (1) provided the *flame-spread rating* is not more than,

(a) 25 on the upper half of the wall, and

(b) 150 on the lower half of the wall.

(3) The *flame-spread rating* limits specified in Sentences (1) and (2) for corridors referred to in Sentence (1) does not apply to a corridor in which the *flame-spread rating* is not more than 150 provided the *floor area* is *sprinklered*.

(4) The *flame-spread rating* limits specified in Sentences (1), (2) and (3) apply to *occupancies* in the corridor as well as to the corridor itself.

(5) Except in a *floor area* that is *sprinklered* and as permitted in Sentence (6), the interior ceiling finish of corridors and *occupancies* referred to in Sentences (1) and (4) shall have a *flame-spread rating* not more than 25.

(6) The *flame-spread rating* limits specified in Sentence (5) do not apply to a corridor in which the *flame-spread rating* is not more than 150 provided the *floor area* is *sprinklered*.

3.1.13.7. High Buildings

(1) Except as permitted by Sentences (2) and (3), the interior wall, ceiling and floor finishes in a *building* regulated by the provisions of Subsection 3.2.6. shall conform to the *flame-spread rating* requirements in Articles 3.1.13.2. to 3.1.13.6. and to the *flame-spread rating* and smoke developed classification values in Table 3.1.13.7.

(2) Except for a *building* of Group B *major occupancy* and elevator cars, the *flame-spread rating* and smoke developed classification of interior wall, floor and ceiling finishes need not conform to the values in Table 3.1.13.7., provided the *building* is *sprinklered* and the sprinkler system is electrically supervised in conformance with Sentence 3.2.6.4.(1).

(3) Trim, millwork and doors in an *exit* stairway, a vestibule to an *exit* stairway, a lobby described in Sentence 3.4.4.2.(2), or a corridor not within a *suite* need not conform to the *flame-spread rating* and smoke developed classification requirements of Sentence (1) provided they have,

(a) a *flame-spread rating* not more than 150,

(b) a smoke developed classification not more than 300, and

(c) an aggregate area not more than 10% of the area of the wall or ceiling on which they occur.

Table 3.1.13.7.
Flame-Spread Rating and Smoke Developed Classification in a High Building

Forming Part of Sentence 3.1.13.7.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7
Location or Element	Maximum *Flame-Spread Rating*			Maximum Smoke Developed Classification		
	Wall Surface	Ceiling Surface (1)	Floor Surface	Wall Surface	Ceiling Surface (1)	Floor Surface
Exit stairways, vestibules to *exit* stairs and lobbies described in Sentence 3.4.4.2.(2)	25	25	25	50	50	50
Corridors not within *suites*	(2)	(2)	300	100	50	500
Elevator cars and vestibules	25	25	300	100	100	300
Service spaces and *service rooms*	25	25	25	50	50	50
Other locations and elements	(2)	(2)	No limit	300	50	No limit

Note to Table 3.1.13.7.:

(1) See Sentence 3.1.13.4.(1) for lighting elements.

(2) Other requirements of this Part apply.

(4) Except as permitted in Sentences (5) to (7), *plumbing fixtures* in a *building* regulated by the provisions of Subsection 3.2.6. shall have a smoke developed classification not more than 300.

(5) A *plumbing fixture* that is not located in a Group B *occupancy* need not comply with Sentence (4) if the *building* is *sprinklered*.

(6) A *plumbing fixture* may have a smoke developed classification more than 300 but not more than 500 if,

(a) it is in a room where the wall surfaces have a smoke developed classification not more than 200, and

(b) it is located in,

  (i) a Group C *occupancy*, or

  (ii) a Group B *occupancy* and the *building* is *sprinklered*.

(7) A therapeutic bathing system in a Group B *occupancy* need not comply with Sentence (4) if the room in which it is located,

(a) does not open directly into patients' or residents' sleeping rooms, and

(b) is *sprinklered*.

3.1.13.8. Noncombustible Construction

(1) In a *building* required to be of *noncombustible construction*,

(a) the *flame-spread ratings* required by Subsection 3.1.5. shall apply in addition to the requirements in this Subsection, and

(b) the *flame-spread ratings* for *exits* in this Subsection shall also apply to any surface in the *exit* that would be exposed by cutting through the material in any direction, except that this requirement does not apply to doors, *heavy timber construction* in a *sprinklered building* and *fire-retardant treated wood*.

3.1.13.9. Underground Walkways

(1) Except for paint, the interior wall and ceiling finishes of an underground *walkway* shall be of *noncombustible materials*.

3.1.13.10. Exterior Exit Passageway

(1) The wall and ceiling finishes of an exterior *exit* passageway that provides the only *means of egress* from the rooms or *suites* it serves, including the soffit beneath and the *guard* on the passageway, shall have a *flame-spread rating* not more than 25, except that a *flame-spread rating* not more than 150 is permitted for up to 10% of the total wall area and for up to 10% of the total ceiling area.

3.1.14. Roof Assemblies

3.1.14.1. Fire-Retardant Treated Wood Roof Systems

(1) If a *fire-retardant treated wood* roof system is used to comply with the requirements of Subsection 3.2.2., the roof deck assembly shall meet the conditions of acceptance of CAN/ULC-S126-M, "Test for Fire Spread Under Roof-Deck Assemblies".

(2) Supports for the roof deck assembly referred to in Sentence (1) shall consist of,

(a) *fire-retardant treated wood*,

(b) *heavy timber construction*,

(c) *noncombustible construction*, or

(d) a combination of the items described in Clauses (a), (b) and (c).

3.1.14.2. Metal Roof Deck Assemblies

(1) Except as permitted by Sentence (2), a metal roof deck assembly shall meet the conditions of acceptance of CAN/ULC-S126-M, "Test for Fire Spread Under Roof-Deck Assemblies", if,

(a) it supports a *combustible* material above the deck that could propagate a fire beneath the roof deck assembly, and

(b) the deck is used to comply with the requirements of Sentences 3.2.2.25.(2), 3.2.2.32.(2), 3.2.2.53.(2), 3.2.2.59.(2), 3.2.2.69.(2), and 3.2.2.76.(2) for *noncombustible construction*.

(2) The requirements of Sentence (1) are waived provided,

(a) the *combustible* material above the roof deck is protected by not less than 12.7 mm thick gypsum board, mechanically fastened to a supporting assembly if located beneath the roof deck, or by a thermal barrier conforming to one of Clauses 3.1.5.12.(2)(c) to (e) that is located,

  (i) on the underside of the *combustible* material, or

  (ii) beneath the roof deck,

(b) the *building* is *sprinklered*, or

(c) the roof assembly has a *fire-resistance rating* not less than 45 min.

3.1.15. Roof Covering

3.1.15.1. Roof Covering Classification

(1) A roof covering classification shall be determined in conformance with CAN/ULC-S107-M, "Fire Tests of Roof Coverings".

3.1.15.2. Roof Coverings

(1) Except as permitted by Sentence (2), every roof covering shall have a Class A, B or C classification as determined in accordance with Article 3.1.15.1.

(2) A roof covering is not required to have a Class A, B or C classification for

(a) a tent,

(b) an *air-supported structure*, or

(c) a *building* of Group A, Division 2 *occupancy* not more than 2 *storeys* in *building height* and not more than 1 000 m^2 in *building area* provided the roof covering is underlaid with *noncombustible* material.

3.1.16. Fabrics

3.1.16.1. Fabric Awnings, Canopies and Marquees

(1) Fabrics used as part of an awning, *canopy* or *marquee* that is located within or attached to a *building* of any type of construction shall conform to CAN/ULC-S109, "Flame Tests of Flame-Resistant Fabrics and Films".

3.1.17. Occupant Load

3.1.17.1. Occupant Load Determination

(1) The *occupant load* of a *floor area* or part of a *floor area*, or of a *building* or part of a *building* not having a *floor area*, shall be based on,

(a) the number of seats in an *assembly occupancy* having fixed seats,

(b) 2 persons per sleeping room or sleeping area in a *dwelling unit* or *suite*, or

(c) the number of persons,

(i) for which the area is designed, or

(ii) determined from Table 3.1.17.1. for *occupancies* other than those described in Clauses (a) and (b).

(2) If a *floor area* or part of it has been designed for an *occupant load* other than that determined from Table 3.1.17.1., a permanent sign indicating that *occupant load* shall be posted in a conspicuous location.

Table 3.1.17.1.
Occupant Load

Forming Part of Article 3.1.17.1.

COLUMN 1	COLUMN 2
Type of Use of *Building* or *Floor Area* or Part of *Floor Area*	Area per Person, m^2
Assembly uses	
space with fixed seats	See Clause (1)(a)
space with nonfixed seats	0.75
stages for theatrical performances	0.75
space with nonfixed seats and tables	0.95
standing space	0.40
stadia and grandstands	0.60
bowling alleys, pool and billiard rooms	9.30
classrooms	1.85
school shops and vocational rooms	9.30
reading or writing rooms or lounges	1.85
dining, alcoholic beverage and cafeteria space	1.10
laboratories in schools	4.60
exhibition halls other than those classified in Group E	2.80
Care or detention uses	
B-1 : detention quarters	11.60
B-2 : treatment and sleeping room areas	10.00
B-3 : sleeping room areas	10.00
(See also Article 3.7.1.3.)	
Residential uses	
dwelling units	See Clause (1)(b)
dormitories	4.60
Business and personal services uses	
personal service shops	4.60
offices	9.30
Mercantile uses	
basements and *first storeys*	3.70
second storeys having a principal entrance from a pedestrian thoroughfare or a parking area	3.70
dining, alcoholic beverage and cafeteria space	1.10
other storeys	5.60
Industrial uses	
manufacturing or process rooms	4.60
storage garages	46.00
storage spaces (warehouse)	28.00
aircraft hangars	46.00
Other uses	
cleaning and repair of goods	4.60
kitchens	9.30
storage	46.00
public corridors intended for *occupancies* in addition to pedestrian travel	3.70

(3) For the purposes of this Article, *mezzanines*, tiers and balconies shall be regarded as part of the *floor area*.

(4) If a room or group of rooms is intended for different *occupancies* at different times, the value to be used from Table 3.1.17.1. shall be the value that gives the greatest number of persons for the *occupancies* concerned.

(5) Except as provided by Sentences (6) or (7), in dining, alcoholic beverage and cafeteria spaces the *occupant load* shall be determined from Table 3.1.17.1.

(6) The *occupant load* in Sentence (5) is permitted to be the number of persons for which the space is designed.

(7) The *occupant load* in Sentence (6) shall be not more than that determined by using an area of 0.6 m^2 per person.

3.1.17.2. Dance Floor

(1) The *occupant load* of a room in which a dance floor is situated shall be calculated in respect of that portion of the room that is not occupied by the dance floor.

3.1.17.3. Public Pools

(1) The *occupant load* of a *public pool*, except a *wave action pool*, shall be determined by the following formula:

$$occupant\ load = \frac{D}{2.5} + \frac{S}{1.4}$$

where,

D = the water surface area in square metres of the part of the pool that is deeper than 1 350 mm; and

S = the water surface area in square metres of the part of the pool that is 1 350 mm in depth or less.

(2) The *occupant load* of a *wave action pool* shall be determined by the following formula:

$$occupant\ load = \frac{D}{2.5} + \frac{S}{1.1}$$

where,

D = the water surface area in square metres of the part of the pool where the still water depth is greater than 1 000 mm; and

S = the water surface area in square metres of the part of the pool where the still water depth is 1 000 mm or less.

3.1.18. Drainage and Grades

3.1.18.1. Drainage

(1) The *building* shall be located and the *building* site graded so that water will not accumulate at or near the *building* and will not adversely affect any adjacent properties.

3.1.19. Above Ground Electrical Conductors

3.1.19.1. Clearance to Buildings

(1) Where a *building* is to be *constructed* in proximity to existing above ground electrical conductors of a voltage not less than 2.5 kV and not more than 46 kV,

(a) the *building* shall not be located beneath the conductors, and

(b) the horizontal clearance between the *building* and the maximum conductor swing shall be not less than 3 m.

(2) Where a *building* is to be *constructed* in proximity to existing above ground electrical conductors of a voltage more than 46 kV, the clearances between the *building* and the conductors shall conform to the requirements of CAN/CSA-C22.3 No.1, "Overhead Systems".

3.1.19.2. Exception

(1) Article 3.1.19.1. does not apply to *buildings* containing electrical equipment and electrical installations used exclusively in the generation, transformation or transmission of electrical power or energy intended for sale or distribution to the public.

Section 3.2. Building Fire Safety

3.2.1. General

3.2.1.1. Exceptions in Determining Building Height

(1) A roof-top enclosure provided for elevator machinery, a stairway or a *service room* used for no purpose other than for service to the *building*, shall not be considered as a *storey* in calculating the *building height*.

(2) Space under tiers of seats in a *building* of the arena type shall not be considered as adding to the *building height* provided the space is used only for dressing rooms, concession stands and similar purposes incidental to the *major occupancy* of the *building*.

(3) Except as required by Sentence (5), the space above a *mezzanine* need not be considered as a *storey* in calculating *building height* provided,

(a) the aggregate area of *mezzanines* that are not superimposed does not exceed 40% of the open area of the room in which they are located, and

(b) except as permitted in Sentence (8) and Sentence 3.3.2.11.(3) the space above the *mezzanine* is used as an open area without *partitions* or subdividing walls higher than 1070 mm above the *mezzanine* floor.

(4) Except as required by Sentence (5), the space above a *mezzanine* need not be considered as a *storey* in calculating the *building height* provided,

(a) the aggregate area of *mezzanines* that are not superimposed and do not meet the conditions of Sentence (3) does not exceed 10% of the *floor area* in which they are located, and

(b) the area of *mezzanine* in a *suite* does not exceed 10% of the area of that *suite*.

(5) Except as permitted by Sentences (6) and (7), each level of *mezzanine* that is partly or wholly superimposed above the first level of *mezzanine* shall be considered as a *storey* in calculating the *building height*.

(6) Platforms intended solely for periodic inspection and elevated catwalks need not be considered as floor assemblies or *mezzanines* for the purpose of determining *building height* provided,

(a) they are not used for storage,

(b) they are constructed with *noncombustible* materials unless the *building* is permitted to be of *combustible construction*, and

(c) where they are intended to be occupied, they have an *occupant load* of not more that 4 persons.

(7) *Mezzanines*, elevated walkways and platforms that are intended to be occupied in Group F, Division 2 or 3 *major occupancies* need not be considered as *storeys* in calculating *building height* provided,

(a) the *building* is of *noncombustible construction*, and

(b) the *occupant load* is not more than 4 persons.

(8) The space above a *mezzanine* conforming to Sentence (3) is permitted to include an enclosed space whose area does not exceed 10% of the open area of the room in which the *mezzanine* is located, provided the enclosed space does not obstruct visual communication between the open space above the *mezzanine* and the room in which it is located.

(9) A *service space* in which facilities are included to permit a person to enter and to undertake maintenance and other operations pertaining to *building* services from within the *service space* need not be considered a *storey* if it conforms to Articles 3.2.5.15. and 3.3.1.23. and Sentences 3.2.4.19.(12), 3.2.7.3.(2), 3.3.1.3.(7), 3.4.2.4.(3) and 3.4.4.4.(9).

3.2.1.2. Storage Garage Considered as a Separate Building

(1) A *basement* used primarily as a *storage garage* is permitted to be considered as a separate *building* for the purposes of Subsection 3.2.2., provided the floor and roof assemblies above the *basement* and the exterior walls of the *basement* above the adjoining ground level are constructed as *fire separations* of masonry or concrete having a *fire-resistance rating* not less than 2 h, except as permitted by Sentence (2).

(2) The exterior wall of a *basement* that is required to be a *fire separation* with a *fire-resistance rating* in accordance with Sentence (1) is permitted to be penetrated by openings that are not protected by *closures* provided,

(a) the *storage garage* is *sprinklered*,

(b) every opening in the exterior wall is separated from *storeys* above the opening by a projection of the floor or roof assembly above the *basement*, extending not less than,

(i) 1 000 mm beyond the exterior face of the *storage garage* if the upper *storeys* are required to be of *noncombustible construction*, or

(ii) 2 000 mm beyond the exterior face of the *storage garage* if the upper *storeys* are permitted to be of *combustible construction*, or

(c) the exterior walls of any *storeys* located above the floor or roof assembly referred to in Sentence (1) are recessed behind the outer edge of the assembly by not less than,

(i) 1 000 mm if the upper *storeys* are required to be of *noncombustible construction*, or

(ii) 2 000 mm if the upper *storeys* are permitted to be of *combustible construction*.

(3) The floor or roof assembly projection referred to in Clause (2)(b) shall have a *fire-resistance rating* not less than 2 h and shall have no openings within the projection.

3.2.1.3. Roof Considered as a Wall

(1) For the purposes of this Section any part of a roof that is pitched at an angle of 60° or more to the horizontal and is adjacent to a space intended for *occupancy* within a *building* shall be considered as part of an exterior wall of the *building*.

3.2.1.4. Floor Assembly over Basement

(1) Except as permitted by Sentences 3.2.2.42.(3), 3.2.2.43.(3), 3.2.2.45.(3), 3.2.2.46.(3), 3.2.2.47.(3) or 3.2.2.48.(3), a floor assembly immediately above a *basement* shall be constructed as a *fire separation* having a *fire-resistance rating* conforming to the requirements of Articles 3.2.2.20. to 3.2.2.83. for a floor assembly, but not less than 45 min.

(2) All *loadbearing* walls, columns and arches supporting a floor assembly immediately above a *basement* shall have a *fire-resistance rating* not less than that required by Sentence (1) for the floor assembly.

3.2.1.5. Fire Containment in Basements

(1) Except as permitted by Sentences (2) and 3.2.2.15.(3), in a *building* in which an automatic sprinkler system is not required to be installed by Articles 3.2.2.20. to 3.2.2.83., every *basement* shall,

(a) be *sprinklered*, or

(b) be subdivided into *fire compartments* not more than 600 m^2 in area by a *fire separation* having a *fire-resistance rating* not less than that required for the floor assembly immediately above the *basement*.

(2) An *open-air storey* need not conform to Sentence (1).

3.2.1.6. Mezzanines

(1) The floor assembly of a *mezzanine* that is required to be considered as a *storey* in calculating *building height* shall be constructed in conformance with the *fire separation* requirements for floor assemblies in Articles 3.2.2.20. to 3.2.2.83.

3.2.2. Building Size and Construction Relative to Occupancy

3.2.2.1. Application

(1) Except as permitted by Article 3.2.2.3., a *building* shall be constructed in conformance with this Subsection to prevent fire spread and collapse caused by the effects of fire.

3.2.2.2. Special and Unusual Structures

(1) A structure that cannot be identified with the characteristics of a *building* in Articles 3.2.2.20. to 3.2.2.83. shall be protected against fire spread and collapse in conformance with good fire protection engineering practice.

3.2.2.3. Exceptions to Structural Fire Protection

(1) Fire protection is not required for,

(a) steel lintels above openings not more than 2 m wide in *loadbearing* walls and not more than 3 m wide in non-*loadbearing* walls,

(b) steel lintels above openings more than 2 m wide in *loadbearing* walls and more than 3 m wide in non-*loadbearing* walls, provided the lintels are supported at intervals of not more than 2 m by structural members with the required *fire-resistance rating*,

(c) the bottom flanges of shelf angles and plates that are not a part of the structural frame,

(d) steel members for framework around elevator hoistway doorways, steel for the support of elevator and dumbwaiter guides, counterweights and other similar equipment, that are entirely enclosed in a hoistway and are not a part of the structural frame of the *building*,

(e) steel members of stairways and escalators that are not a part of the structural frame of a *building*,

(f) steel members of porches, exterior balconies, exterior stairways, fire escapes, cornices, *marquees* and other similar appurtenances, provided they are outside an exterior wall of a *building*, and

(g) *loadbearing* steel or concrete members wholly or partly outside a *building* face in a *building* not more than 4 *storeys* in *building height* and classified as Group A, B, C, D or F, Division 3 *major occupancy* provided the members are,

  (i) not less than 1 000 mm away from any *unprotected opening* in an exterior wall, or

  (ii) shielded from heat radiation in the event of a fire within the *building* by construction that will provide the same degree of protection that would be necessary if the member was located inside the *building*, with the protection extending on either side of the member a distance equal to the projection of the member from the face of the wall.

3.2.2.4. Buildings with Multiple Major Occupancies

(1) The requirements restricting fire spread and collapse for a *building* of a single *major occupancy* classification are provided in this Subsection according to its *building height* and *building area*.

(2) If a *building* contains more than one *major occupancy*, classified in more than one Group or Division, the requirements of this Subsection concerning *building* size and construction relative to *major occupancy* shall apply according to Articles 3.2.2.5. to 3.2.2.8.

3.2.2.5. Applicable Building Height and Area

(1) In determining the fire safety requirements of a *building* in relation to each of the *major occupancies* contained in it, the *building height* and *building area* of the entire *building* shall be used.

3.2.2.6. Multiple Major Occupancies

(1) Except as permitted by Articles 3.2.2.7. and 3.2.2.8., in a *building* containing more than one *major occupancy*, the requirements of this Subsection for the most restricted *major occupancy* contained shall apply to the whole *building*.

3.2.2.7. Superimposed Major Occupancies

(1) Except as permitted by Article 3.2.2.8., in a *building* in which one *major occupancy* is located entirely above another *major occupancy*, the requirements in this Subsection for each portion of the *building* containing a *major occupancy* shall apply to that portion as if the entire *building* was of that *major occupancy*.

(2) If one *major occupancy* is located above another *major occupancy*, the *fire-resistance rating* of the floor assembly between the *major occupancies* shall be determined on the basis of the requirements of this Subsection for the lower *major occupancy*.

3.2.2.8. Exceptions for Major Occupancies

(1) In a *building* in which the aggregate area of all *major occupancies* in a particular Group or Division is not more than 10% of the *floor area* of the *storey* in which they are located, these *major occupancies* need not be considered as *major occupancies* for the purposes of this Subsection, provided they are not classified as Group F, Division 1 or 2 *occupancies*.

(2) A helicopter landing area on the roof of a *building* need not be considered a *major occupancy* for purposes of Subsection 3.2.2. where such landing area is not more than 10% of the area of the roof.

3.2.2.9. Crawl Spaces

(1) For the purposes of Articles 3.2.1.4. and 3.2.1.5., a crawl space shall be considered as a *basement* if it is,

(a) more than 1 800 mm high between the lowest part of the floor assembly and the ground or other surface below,

(b) used for any *occupancy*,

(c) used for the passage of *flue pipes*, or

(d) used as a *plenum* in *combustible construction*.

(2) A floor assembly immediately above a crawl space is not required to be constructed as a *fire separation* and is not required to have a *fire-resistance rating* provided the crawl space is not required to be considered as a *basement* by Sentence (1).

3.2.2.10. Streets

(1) Every *building* shall face a *street* located in conformance with the requirements of Articles 3.2.5.4 and 3.2.5.5 for access routes.

(2) For the purposes of Subsections 3.2.2. and 3.2.5. an access route conforming to Subsection 3.2.5. is permitted to be considered as a *street*.

(3) A *building* is considered to face 2 *streets* provided not less than 50% of the *building* perimeter is located within 15 m of the *street* or *streets*.

(4) A *building* is considered to face 3 *streets* provided not less than 75% of the *building* perimeter is located within 15 m of the *street* or *streets*.

(5) Enclosed spaces, tunnels, bridges and similar structures, even though used for vehicular or pedestrian traffic, are not considered as *streets* for the purpose of this Part.

3.2.2.11. Exterior Balconies

(1) An exterior balcony shall be constructed in accordance with the type of construction required by Articles 3.2.2.20. to 3.2.2.83., as applicable to the *occupancy* classification of the *building*.

3.2.2.12. Exterior Passageways

(1) An elevated exterior passageway used as part of a *means of egress* shall conform to the requirements of Articles 3.2.2.20. to 3.2.2.83. for *mezzanines*.

3.2.2.13. Occupancy on Roof

(1) A portion of a roof that supports an *occupancy* shall be constructed in conformance with the *fire separation* requirements of Articles 3.2.2.20. to 3.2.2.83. for floor assemblies.

3.2.2.14. Roof-Top Enclosures

(1) A roof-top enclosure for elevator machinery or for a *service room* shall be constructed in accordance with the type of construction required by Articles 3.2.2.20. to 3.2.2.83.

(2) A roof-top enclosure for elevator machinery or for a *service room*, not more than one *storey* high, is not required to have a *fire-resistance rating*.

(3) A roof-top enclosure for a stairway shall be constructed in accordance with the type of construction required by Articles 3.2.2.20. to 3.2.2.83.

(4) A roof-top enclosure for a stairway need not have a *fire-resistance rating* nor be constructed as a *fire separation*.

3.2.2.15. Storeys below Ground

(1) If a *building* is erected entirely below the adjoining finished ground level and does not extend more than one *storey* below that ground level, the minimum precautions against fire spread and collapse shall be the same as are required for *basements* under a *building* of 1 *storey* in *building height* having the same *occupancy* and *building area*.

(2) If any portion of a *building* is erected entirely below the adjoining finished ground level and extends more than one *storey* below that ground level, the following minimum precautions against fire spread and collapse shall be taken:

(a) except as permitted by Sentence (3), the *basements* shall be *sprinklered*,

(b) a floor assembly below the ground level shall be constructed as a *fire separation* with a *fire-resistance rating* not less than,

  (i) 3 h if the *basements* are intended for use as Group E or Group F, Division 1 or 2 *occupancies*, or

  (ii) 2 h if the *basements* are not intended for use as Group E or Group F, Division 1 or 2 *occupancies*, and

(c) all *loadbearing* walls, columns and arches shall have a *fire-resistance rating* not less than that required for the construction that they support.

(3) If the *first storey* of a *building* is not required to be *sprinklered*, sprinklers are not required in the *storey* immediately below the *first storey*, provided the *storey* below,

(a) contains only *residential occupancies*, and

(b) has at least one unobstructed access opening conforming to Sentence 3.2.5.1.(2) installed on that *storey* for each 15 m of wall length in at least one wall required by this Subsection to face a *street*.

3.2.2.16. Heavy Timber Roof Permitted

(1) Unless otherwise permitted by Articles 3.2.2.20. to 3.2.2.83., a roof assembly in a *building* up to 2 *storeys* in *building height* is permitted to be of *heavy timber construction* regardless of *building area* or type of construction required, provided the *building* is *sprinklered*.

(2) If Sentence (1) permits a roof assembly to be of *heavy timber construction*, structural members in the *storey* immediately below the roof assembly are permitted to be of *heavy timber construction*.

3.2.2.17. Sprinklers in Lieu of Roof Rating

(1) The requirements in Articles 3.2.2.20. to 3.2.2.83. for roof assemblies to have a *fire-resistance rating* are permitted to be waived provided,

(a) the *building* is *sprinklered*,

(b) the sprinkler system in Clause (a) is electrically supervised in conformance with Sentence 3.2.4.9.(2), and

(c) the operation of the sprinkler system in Clause (a) will cause a signal to be transmitted to the fire department in conformance with Sentence 3.2.4.7.(4).

3.2.2.18. Automatic Sprinkler System Required

(1) If an automatic sprinkler system is required by Articles 3.2.2.20. to 3.2.2.83., the system shall conform to the requirements of Articles 3.2.4.7., 3.2.4.8., 3.2.4.9. and 3.2.5.13.

3.2.2.19. Buildings Containing Impeded Egress Zones

(1) A *building* containing an *impeded egress zone* and conforming to the appropriate requirements of Articles 3.2.2.20. to 3.2.2.83. is not required to conform to the requirements of Articles 3.2.2.36. and 3.2.2.37. for a Group B, Division 1 *major occupancy* provided,

(a) the *building* is *sprinklered*,

(b) it is not more than 1 *storey* in *building height*,

(c) it does not include,

  - (i) a *contained use area*,
  - (ii) sleeping accommodation,
  - (iii) a *high hazard industrial occupancy*, or
  - (iv) a *mercantile occupancy*,

(d) the *building area* is not more than 6 400 m^2 if the *building* includes a *medium hazard industrial occupancy*,

(e) the *impeded egress zone* does not extend beyond the boundaries of the *fire compartment* in which it is located, and

(f) the *occupant load* of the *impeded egress zone* is not more than 100.

3.2.2.20. Group A, Division 1, Any Height, Any Area, Sprinklered

(1) Except as permitted by Articles 3.2.2.21. and 3.2.2.22., a *building* classified as Group A, Division 1 shall conform to Sentence (2).

(2) Except as permitted by Article 3.2.2.16., the *building* referred to in Sentence (1) shall be of *noncombustible construction*, and,

(a) except as permitted by Sentence 3.2.2.7.(1), the *building* shall be *sprinklered*,

(b) floor assemblies shall be *fire separations* with a *fire-resistance rating* not less than 2 h,

(c) *mezzanines* shall have a *fire-resistance rating* not less than 1 h, and

(d) *loadbearing* walls, columns and arches shall have a *fire-resistance rating* not less than that required for the supported assembly.

3.2.2.21. Group A, Division 1, One Storey, Limited Area

(1) A *building* classified as Group A, Division 1 is permitted to conform to Sentence (2) provided,

(a) it is not more than 1 *storey* in *building height*,

(b) it has less than 40% of the area of the *building* as 2 *storeys* for the purpose of,

  - (i) development of productions including preparation of scenery and costumes and rehearsal of performers,
  - (ii) organization of performers, scenery and sound equipment,
  - (iii) preparation by performers for a performance,
  - (iv) managerial functions, or
  - (v) toilets, rest rooms and similar public facilities,

(c) it has no *occupancy* above or below the auditorium other than one that serves it or is dependent on it,

(d) it is not more than 600 m^2 in *building area*, and

(e) the *occupant load* is not more than 600.

(2) The *building* referred to in Sentence (1) is permitted to be of *heavy timber construction* or *noncombustible construction* used singly or in combination, and,

(a) floor assemblies shall be *fire separations*,

  - (i) with a *fire-resistance rating* not less than 45 min, or
  - (ii) *of heavy timber construction*, and

(b) *loadbearing* walls, columns and arches shall,

  - (i) have a *fire-resistance rating* not less than that required for the supported assembly, or
  - (ii) be of *heavy timber construction*.

3.2.2.22. Group A, Division 1, One Storey

(1) A *building* classified as Group A, Division 1 is permitted to conform to Sentence (2) provided,

(a) it is not more than 1 *storey* in *building height*,

(b) no part of an auditorium floor is more than 5 m above or below *grade*,

(c) no *occupancy* is above or below the auditorium other than one that serves it or is dependent on it, and

(d) the *occupant load* of the auditorium floor is not more than 300.

(2) The *building* referred to in Sentence (1) is permitted to be of *combustible construction* or *noncombustible construction* used singly or in combination, and,

(a) floor assemblies shall be *fire separations* with a *fire-resistance rating* not less than 45 min,

(b) *mezzanines* shall have, if of *combustible construction*, a *fire-resistance rating* not less than 45 min,

(c) roof assemblies shall have, if of *combustible construction*, a *fire-resistance rating* not less than 45 min, and

(d) *loadbearing* walls, columns and arches supporting an assembly required to have a *fire-resistance rating* shall,

  (i) have a *fire-resistance rating* not less than 45 min, or

  (ii) be of *noncombustible construction*, and

(e) *loadbearing* walls, columns and arches supporting a *fire separation* shall have a *fire-resistance rating* not less than that required for the *fire separation*.

3.2.2.23. Group A, Division 2, Any Height, Any Area, Sprinklered

(1) Except as permitted by Articles 3.2.2.24. to 3.2.2.28., a *building* classified as Group A, Division 2 shall conform to Sentence (2).

(2) Except as permitted by Article 3.2.2.16., the *building* referred to in Sentence (1) shall be of *noncombustible construction*, and,

(a) except as permitted by Sentence 3.2.2.7.(1), the *building* shall be *sprinklered*,

(b) floor assemblies shall be *fire separations* with a *fire-resistance rating* not less than 2 h,

(c) *mezzanines* shall have a *fire-resistance rating* not less 1 h, and

(d) *loadbearing* walls, columns and arches shall have a *fire-resistance rating* not less than that required for the supported assembly.

3.2.2.24. Group A, Division 2, up to 6 Storeys, Any Area, Sprinklered

(1) A *building* classified as Group A, Division 2, that is not limited by *building area*, is permitted to conform to Sentence (2) provided,

(a) except as permitted by Sentence 3.2.2.7.(1), *the building* is *sprinklered*, and

(b) it is not more than 6 *storeys* in *building height*.

(2) Except as permitted by Article 3.2.2.16., the *building* referred to in Sentence (1) shall be of *noncombustible construction*, and,

(a) floor assemblies shall be *fire separations* with a *fire-resistance rating* not less than 1 h,

(b) *mezzanines* shall have a *fire-resistance rating* not less than 1 h, and

(c) all *loadbearing* walls, columns and arches shall have a *fire-resistance rating* not less than that required for the supported assembly.

3.2.2.25. Group A, Division 2, up to 2 Storeys

(1) A *building* classified as Group A, Division 2 is permitted to conform to Sentence (2) provided,

(a) it is not more than 2 *storeys* in *building height*, and

(b) it has a *building area* not more than the value in Table 3.2.2.25.

Table 3.2.2.25.
Maximum Building Area, Group A, Division 2, up to 2 Storeys

Forming Part of Sentence 3.2.2.25.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
No. of *Storeys*	Maximum Area, m²		
	Facing 1 *Street*	Facing 2 *Streets*	Facing 3 *Streets*
1	1 600	2 000	2 400
2	800	1 000	1 200

(2) The *building* referred to in Sentence (1) is permitted to be of *combustible construction* or *noncombustible construction* used singly or in combination, and,

(a) floor assemblies shall be *fire separations* and, if of *combustible construction*, shall have a *fire-resistance rating* not less than 45 min,

(b) *mezzanines* shall have, if of *combustible construction*, a *fire-resistance rating* not less 45 min,

(c) roof assemblies shall have, if of *combustible construction*, a *fire-resistance rating* not less than 45 min, except that in a *building* not more than 1 *storey* in *building height*, the *fire-resistance rating* is permitted to be waived provided the roof assembly is constructed as a *fire-retardant treated wood* roof system conforming to Article 3.1.14.1., and the *building area* is not more than,

  (i) 800 m^2 if facing one *street*,

  (ii) 1 000 m^2 if facing 2 *streets*, or

  (iii) 1 200 m^2 if facing 3 *streets*, and

(d) *loadbearing* walls, columns and arches supporting an assembly required to have a *fire-resistance rating* shall,

  (i) have a *fire-resistance rating* not less than 45 min, or

  (ii) be of *noncombustible construction*.

3.2.2.26. Group A, Division 2, up to 2 Storeys, Increased Area, Sprinklered

(1) A *building* classified as Group A, Division 2 is permitted to conform to Sentence (2) provided,

(a) except as permitted by Sentence 3.2.2.7.(1), the *building* is *sprinklered*,

(b) it is not more than 2 *storeys* in *building height*, and

(c) it has a *building area* not more than,

  (i) 4 800 m^2 if 1 *storey* in *building height*, or

  (ii) 2 400 m^2 if 2 *storeys* in *building height*.

(2) The *building* referred to in Sentence (1) is permitted to be of *combustible construction* or *noncombustible construction* used singly or in combination, and,

(a) floor assemblies shall be *fire separations* and, if of *combustible construction*, shall have a *fire-resistance rating* not less than 45 min,

(b) *mezzanines* shall have, if of *combustible construction*, a *fire-resistance rating* not less 45 min, and

(c) *loadbearing* walls, columns and arches supporting an assembly required to have a *fire-resistance rating* shall,

  (i) have a *fire-resistance rating* not less than 45 min, or

  (ii) be of *noncombustible construction*.

3.2.2.27. Group A, Division 2, up to 2 Storeys, Sprinklered

(1) A *building* classified as Group A, Division 2 is permitted to be of *combustible construction* or *noncombustible construction* used singly or in combination, provided,

(a) except as permitted by Sentence 3.2.2.7.(1), the *building* is *sprinklered*,

(b) it is not more than 2 *storeys* in *building height*, and

(c) it has a *building area* not more than,

  (i) 2 400 m^2 if 1 *storey* in *building height* with no *basement*,

  (ii) 1 200 m^2 if 1 *storey* in *building height*, or

  (iii) 600 m^2 if 2 *storeys* in *building height*.

3.2.2.28. Group A, Division 2, One Storey

(1) A *building* classified as Group A, Division 2 is permitted to be of *combustible construction* or *noncombustible construction* used singly or in combination, provided,

(a) it is not more than 1 *storey* in *building height*, and

(b) except as permitted by Sentence (2), it has a *building area* not more than,

  (i) 400 m^2 if facing one *street*,

  (ii) 500 m^2 if facing 2 *streets*, or

  (iii) 600 m^2 if facing 3 *streets*.

(2) In a *building* referred to in Sentence (1) without a *basement*, the *building area* limits of Sentence (1) are permitted to be doubled provided a *fire separation* with a *fire-resistance rating* not less than 1 h is used to separate the *building* into *fire compartments*, each one of which does not exceed the area limits of Clause 1(b).

3.2.2.29. Group A, Division 3, Any Height, Any Area

(1) Except as permitted by Articles 3.2.2.30. to 3.2.2.34., a *building* classified as Group A, Division 3 shall conform to Sentences (2) and (3).

(2) Except as permitted by Article 3.2.2.16., the *building* referred to in Sentence (1) shall be of *noncombustible construction*, and,

(a) except as permitted by Sentence 3.2.2.7.(1), the *building* shall be *sprinklered* if it is regulated by Subsection 3.2.6.,

(b) floor assemblies shall be *fire separations* with a *fire-resistance rating* not less than 2 h,

(c) *mezzanines* shall have a *fire-resistance rating* not less than 1 h,

(d) if the *building* is not *sprinklered*, roof assemblies shall have a *fire-resistance rating* not less than 1 h, and

(e) *loadbearing* walls, columns and arches shall have a *fire-resistance rating* not less than that required for the supported assembly.

(3) If intended for occasional use for trade shows and similar exhibition purposes, the *building* referred to in Sentence (1) that is more than 1500 m^2 in *building area* shall be *sprinklered*.

3.2.2.30. Group A, Division 3, up to 2 Storeys

(1) A *building* classified as Group A, Division 3 is permitted to conform to Sentence (2) provided,

(a) it is not more than 2 *storeys* in *building height*, and

(b) it has a *building area* not more than the value in Table 3.2.2.30.

Table 3.2.2.30.
Maximum Building Area, Group A, Division 3, up to 2 Storeys

Forming Part of Sentence 3.2.2.30.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
No. of *Storeys*	Maximum Area, m^2		
	Facing 1 *Street*	Facing 2 *Streets*	Facing 3 *Streets*
1	4 000	5 000	6 000
2	2 000	2 500	3 000

(2) Except as permitted by Clauses (c) and (d), the *building* referred to in Sentence (1) shall be of *noncombustible construction*, and,

(a) floor assemblies shall be *fire separations* with a *fire-resistance rating* not less than 1 h,

(b) *mezzanines* shall have a *fire-resistance rating* not less than 1 h,

(c) roof assemblies shall,

  (i) have a *fire-resistance rating* not less than 45 min, or

  (ii) be of *heavy timber construction*, and

(d) *loadbearing* walls, columns and arches shall have a *fire-resistance rating* not less than that required for the supported assembly, except that arches and structural members within the *storey* immediately below a roof assembly are permitted to be of *heavy timber construction*.

(3) If intended for occasional use for trade shows and similar exhibition purposes, the *building* referred to in Sentence (1) that is more than 1500 m^2 in *building area* shall be *sprinklered*.

3.2.2.31. Group A, Division 3, up to 2 Storeys, Sprinklered

(1) A *building* classified as Group A, Division 3 is permitted to conform to Sentence (2) provided,

(a) except as permitted by Sentence 3.2.2.7.(1), the *building* shall be *sprinklered*,

(b) it is not more than 2 *storeys* in *building height*, and

(c) it has a *building area* not more than,

  (i) 12 000 m^2 if 1 *storey* in *building height*, or

  (ii) 6 000 m^2 if 2 *storeys* in *building height*.

(2) Except as permitted by Clause (c) and Article 3.2.2.16., the *building* referred to in Sentence (1) shall be of *noncombustible construction*, and,

- (a) floor assemblies shall be *fire separations* with a *fire-resistance rating* not less than 1 h,
- (b) *mezzanines* shall have a *fire-resistance rating* not less than 1 h, and
- (c) *loadbearing* walls, columns and arches shall have a *fire-resistance rating* not less than that required for the supported assembly, except that arches are permitted to be of *heavy timber construction*.

3.2.2.32. Group A, Division 3, One Storey, Increased Area

(1) A *building* classified as Group A, Division 3 is permitted to conform to Sentences (2) and (3) provided,

- (a) it is not more than 1 *storey* in *building height*, and
- (b) it has a *building area* not more than,
  - (i) 2 400 m^2 if facing one *street*,
  - (ii) 3 000 m^2 if facing 2 *streets*, or
  - (iii) 3 600 m^2 if facing 3 *streets*.

(2) The *building* referred to in Sentence (1) is permitted to be of *combustible construction* or *noncombustible construction* used singly or in combination, and,

- (a) *mezzanines* shall have, if of *combustible construction*, a *fire-resistance rating* not less than 45 min,
- (b) roof assemblies shall have, if of *combustible construction*, a *fire-resistance rating* not less than 45 min, except that the *fire-resistance rating* is permitted to be waived provided the roof assembly is constructed as a *fire-retardant treated wood* roof system conforming to Article 3.1.14.1., and the *building area* is not more than,
  - (i) 1 200 m^2 if facing one *street*,
  - (ii) 1 500 m^2 if facing 2 *streets*, or
  - (iii) 1 800 m^2 if facing 3 *streets*, and
- (c) *loadbearing* walls, columns and arches supporting an assembly required to have a *fire-resistance rating* shall,
  - (i) have a *fire-resistance rating* not less than 45 min, or
  - (ii) be of *noncombustible construction*.

(3) If intended for occasional use for trade shows and similar exhibition purposes, the *building* referred to in Sentence (1) that is more than 1500 m^2 in *building area* shall be *sprinklered*.

3.2.2.33. Group A, Division 3, One Storey, Sprinklered

(1) A *building* classified as Group A, Division 3 is permitted to be of *combustible construction* or *noncombustible construction* used singly or in combination, provided,

- (a) except as permitted by Sentence 3.2.2.7.(1), the *building* is *sprinklered*,
- (b) it is not more than 1 *storey* in *building height*, and
- (c) it has a *building area* not more than 7 200 m^2.

3.2.2.34. Group A, Division 3, One Storey

(1) A *building* classified as Group A, Division 3 is permitted to be of *combustible construction* or *noncombustible construction* used singly or in combination, provided,

- (a) it is not more than 1 *storey* in *building height*, and
- (b) it has a *building area* not more than,
  - (i) 1 000 m^2 if facing one *street*,
  - (ii) 1 250 m^2 if facing 2 *streets*, or
  - (iii) 1 500 m^2 if facing 3 *streets*.

3.2.2.35. Group A, Division 4

(1) Except as permitted by Sentences (2) and (3), a *building* classified as Group A, Division 4 shall be of *noncombustible construction*.

(2) Roof assemblies and supporting arches and columns are permitted to be of *heavy timber construction*.

(3) A *building* classified as Group A, Division 4 is permitted to be of *combustible construction* provided,

(a) the *occupant load* is less than 1 500, and

(b) the *building* has a *limiting distance* not less than 6 m.

(4) Sprinklers shall be installed in all spaces below tiers of seats in a *building* classified as Group A, Division 4 if those spaces are used for *occupancy*.

3.2.2.36. Group B, Division 1, Any Height, Any Area, Sprinklered

(1) Except as permitted by Article 3.2.2.37., a *building* classified as Group B, Division 1 shall conform to Sentence (2).

(2) Except as permitted by Article 3.2.2.16., the *building* referred to in Sentence (1) shall be of *noncombustible construction*, and,

(a) except as permitted by Sentence 3.2.2.7.(1), the *building* shall be *sprinklered*,

(b) floor assemblies shall be *fire separations* with a *fire-resistance rating* not less than 2 h,

(c) *mezzanines* shall have a *fire-resistance rating* not less 1 h, and

(d) *loadbearing* walls, columns and arches shall have a *fire-resistance rating* not less than that required for the supported assembly.

3.2.2.37. Group B, Division 1, up to 3 Storeys, Sprinklered

(1) A *building* classified as Group B, Division 1 is permitted to conform to Sentence (2) provided,

(a) except as permitted by Sentence 3.2.2.7.(1) the *building* is *sprinklered*,

(b) it is not more than 3 *storeys* in *building height*, and

(c) it has a *building area*,

  (i) that is not limited if the *building* is not more than 1 *storey* in *building height*,

  (ii) not more than 12 000 m^2 if 2 *storeys* in *building height*, or

  (iii) not more than 8 000 m^2 if 3 *storeys* in *building height*.

(2) Except as permitted by Article 3.2.2.16., the *building* referred to in Sentence (1) shall be of *noncombustible construction*, and,

(a) floor assemblies shall be *fire separations* with a *fire-resistance rating* not less than 1 h,

(b) *mezzanines* shall have a *fire-resistance rating* not less than 1 h, and

(c) *loadbearing* walls, columns and arches shall have a *fire-resistance rating* not less than that required for the supported assembly.

3.2.2.38. Group B, Division 2 or Division 3, Any Height, Any Area, Sprinklered

(1) Except as permitted by Articles 3.2.2.39. to 3.2.2.41., a *building* classified as Group B, Division 2 or Division 3 shall conform to Sentence (2).

(2) Except as permitted by Article 3.2.2.16., the *building* referred to in Sentence (1) shall be of *noncombustible construction*, and,

(a) except as permitted by Sentence 3.2.2.7.(1), the *building* shall be *sprinklered*,

(b) floor assemblies shall be *fire separations* with a *fire-resistance rating* not less than 2 h,

(c) *mezzanines* shall have a *fire-resistance rating* not less 1 h, and

(d) *loadbearing* walls, columns and arches shall have a *fire-resistance rating* not less than that required for the supported assembly.

3.2.2.39. Group B, Division 2 or Division 3, up to 3 Storeys, Sprinklered

(1) A *building* classified as Group B, Division 2 or Division 3 is permitted to conform to Sentence (2) provided,

(a) except as permitted by Sentence 3.2.2.7.(1), the *building* is *sprinklered*,

(b) it is not more than 3 *storeys* in *building height*, and

(c) it has a *building area*,

  (i) that is not limited if the *building* is not more than 1 *storey* in *building height*,

  (ii) not more than 12 000 m^2 if 2 *storeys* in *building height*, or

(iii) not more than 8 000 m^2 if 3 *storeys* in *building height*.

(2) Except as permitted by Article 3.2.2.16., the *building* referred to in Sentence (1) shall be of *noncombustible construction*, and,

(a) floor assemblies shall be *fire separations* with a *fire-resistance rating* not less than 1 h,

(b) *mezzanines* shall have a *fire-resistance rating* not less than 1 h, and

(c) *loadbearing* walls, columns and arches shall have a *fire-resistance rating* not less than that required for the supported assembly.

3.2.2.40. Group B, Division 2 or Division 3, up to 2 Storeys, Sprinklered

(1) A *building* classified as Group B, Division 2 or Division 3 is permitted to conform to Sentence (2) provided,

(a) except as permitted by Sentence 3.2.2.7.(1), the *building* is *sprinklered*,

(b) it is not more than 2 *storeys* in *building height*, and

(c) it has a *building area* not more than,

  (i) 2 400 m^2 if 1 *storey* in *building height*, or

  (ii) 1 600 m^2 if 2 *storeys* in *building height*.

(2) The *building* referred to in Sentence (1) is permitted to be of *combustible construction* or *noncombustible construction* used singly or in combination, and,

(a) floor assemblies shall be *fire separations* with a *fire-resistance rating* not less than 45 min,

(b) *mezzanines* shall have, if of *combustible construction*, a *fire-resistance rating* not less than 45 min, and

(c) *loadbearing* walls, columns and arches shall have a *fire-resistance rating* not less than that required for the supported assembly.

3.2.2.41. Group B, Division 2 or Division 3, One Storey, Sprinklered

(1) A *building* classified as Group B, Division 2 or Division 3 is permitted to be of *combustible construction* or *noncombustible construction* used singly or in combination, provided,

(a) except as permitted by Sentence 3.2.2.7.(1), the *building* is *sprinklered*,

(b) it is not more than 1 *storey* in *building height*, and

(c) it has a *building area* not more than 500 m^2.

3.2.2.42. Group C, Any Height, Any Area

(1) Except as permitted by Articles 3.2.2.43. to 3.2.2.48., a *building* classified as Group C shall conform to Sentence (2).

(2) Except as permitted by Article 3.2.2.16., the *building* referred to in Sentence (1) shall be of *noncombustible construction*, and,

(a) Reserved

(b) except as permitted by Sentence (3), floor assemblies shall be *fire separations* with a *fire-resistance rating* not less than 2 h,

(c) *mezzanines* shall have a *fire-resistance rating* not less 1 h,

(d) if the *building* is not *sprinklered*, roof assemblies shall have a *fire-resistance rating* not less than 1 h, and

(e) *loadbearing* walls, columns and arches shall have a *fire-resistance rating* not less than that required for the supported assembly.

(3) In a *building* that contains *dwelling units* that have more than 1 *storey*, subject to the requirements of Sentence 3.3.4.2.(3), the floor assemblies, including floors over *basements*, that are entirely contained within these *dwelling units*, shall have a *fire-resistance rating* not less than 1 h but need not be constructed as *fire separations*.

3.2.2.43. Group C, up to 6 Storeys

(1) A *building* classified as Group C is permitted to conform to Sentence (2) provided,

(a) it is not more than 6 *storeys* in *building height*, and

(b) it has a *building area* not more than the value in Table 3.2.2.43.A. or Table 3.2.2.43.B.

(2) The *building* referred to in Sentence (1) shall be of *noncombustible construction*, and,

(a) except as permitted by Sentence (3), floor assemblies shall be *fire separations* with a *fire-resistance rating* of not less than 1 h,

(b) *mezzanines* shall have a *fire-resistance rating* of not less than 1 h,

(c) if the *building* is not *sprinklered*, roof assemblies shall have a *fire-resistance rating* not less than 1 h, and

(d) *loadbearing* walls, columns and arches shall have a *fire-resistance rating* not less than that required for the supported assembly.

Table 3.2.2.43.A.
Maximum Building Area, Group C, up to 6 Storeys

Forming Part of Sentence 3.2.2.43.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
No. of *Storeys*	Maximum Area, m^2		
	Facing 1 *Street*	Facing 2 *Streets*	Facing 3 *Streets*
1	unlimited	unlimited	unlimited
2	6 000	unlimited	unlimited
3	4 000	5 000	6 000
4	3 000	3 750	4 500
5	2 400	3 000	3 600
6	2 000	2 500	3 000

Table 3.2.2.43.B.
Maximum Building Area, Group C up to 6 Storeys, Sprinklered

Forming Part of Sentence 3.2.2.43.(1)

COLUMN 1	COLUMN 2
No. of *Storeys*	Maximum Area, m^2
1	unlimited
2	unlimited
3	12 000
4	9 000
5	7 200
6	6 000

(3) In a *building* that contains *dwelling units* that have more than 1 *storey*, subject to the requirements of Sentence 3.3.4.2.(3), the floor assemblies, including floors over *basements*, that are entirely contained within these *dwelling units*, shall have a *fire-resistance rating* not less than 1 h but need not be constructed as *fire separations*.

3.2.2.44. Reserved

3.2.2.45. Group C, up to 4 Storeys, Sprinklered

(1) A *building* classified as Group C is permitted to conform to Sentence (2) provided,

(a) except as permitted by Sentence 3.2.2.7.(1), the *building* is *sprinklered*,

(b) it is not more than 4 *storeys* in *building height*, and

(c) it has a *building area* not more than,

  (i) 7 200 m^2 if 1 *storey* in *building height*,

  (ii) 3 600 m^2 if 2 *storeys* in *building height*,

  (iii) 2 400 m^2 if 3 *storeys* in *building height*, or

  (iv) 1 800 m^2 if 4 *storeys* in *building height*.

(2) The *building* referred to in Sentence (1) is permitted to be of *combustible construction* or *noncombustible construction* used singly or in combination, and,

(a) except as permitted by Sentences (3) and (4), floor assemblies shall be *fire separations* with a *fire-resistance rating* not less than 1 h,

(b) *mezzanines* shall have a *fire-resistance rating* not less than 1 h, and

(c) *loadbearing* walls, columns and arches shall have a *fire-resistance rating* not less than that required for the supported assembly.

(3) In a *building* that contains *dwelling units* that have more than 1 *storey*, subject to the requirements of Sentence 3.3.4.2.(3), the floor assemblies, including floors over *basements*, that are entirely contained within these *dwelling units*, shall have a *fire-resistance rating* not less than 1 h but need not be constructed as *fire separations*.

(4) In a *building* in which there is no *dwelling unit* above another *dwelling unit*, the *fire-resistance rating* for floor assemblies entirely within the *dwelling unit* is waived.

3.2.2.46. Group C, up to 3 Storeys, Increased Area

(1) A *building* classified as Group C is permitted to conform to Sentence (2) provided,

(a) it is not more than 3 *storeys* in *building height*, and

(b) it has a *building area* not more than the value in Table 3.2.2.46.

(2) The *building* referred to in Sentence (1) is permitted to be of *combustible construction* or *noncombustible construction* used singly or in combination, and,

(a) except as permitted by Sentences (3) and (4), floor assemblies shall be *fire separations* with a *fire-resistance rating* not less than 1 h,

(b) *mezzanines* shall have a *fire-resistance rating* not less than 1 h,

(c) roof assemblies shall have a *fire-resistance rating* not less than 1 h, and

(d) *loadbearing* walls, columns and arches shall have a *fire-resistance rating* not less than that required for the supported assembly.

Table 3.2.2.46.
Maximum Building Area, Group C up to 3 Storeys, Increased Area

Forming Part of Sentence 3.2.2.46.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
No. of *Storeys*	Maximum Area, m^2		
	Facing 1 *Street*	Facing 2 *Streets*	Facing 3 *Streets*
1	2 400	3 000	3 600
2	1 200	1 500	1 800
3	800	1 000	1 200

(3) In a *building* that contains *dwelling units* that have more than 1 *storey*, subject to the requirements of Sentence 3.3.4.2.(3), the floor assemblies, including floors over *basements*, that are entirely contained within these *dwelling units*, shall have a *fire-resistance rating* not less than 1 h but need not be constructed as *fire separations*.

(4) In a *building* in which there is no *dwelling unit* above another *dwelling unit*, the *fire-resistance rating* for floor assemblies entirely within the *dwelling unit* is waived.

3.2.2.47. Group C, up to 3 Storeys

(1) A *building* classified as Group C is permitted to conform to Sentence (2) provided,

(a) it is not more than 3 *storeys* in *building height*, and

(b) it has a *building area* not more than the value in Table 3.2.2.47.

Table 3.2.2.47.
Maximum Building Area, Group C, up to 3 Storeys

Forming Part of Sentence 3.2.2.47.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
No. of *Storeys*	Maximum Area, m^2		
	Facing 1 *Street*	Facing 2 *Streets*	Facing 3 *Streets*
1	1 800	2 250	2 700
2	900	1 125	1 350
3	600	750	900

(2) The *building* referred to in Sentence (1) is permitted to be of *combustible construction* or *noncombustible construction* used singly or in combination, and,

(a) except as permitted by Sentences (3) and (4), floor assemblies shall be *fire separations* with a *fire-resistance rating* not less than 45 min,

(b) *mezzanines* shall have, if of *combustible construction* a *fire-resistance rating* not less than 45 min, and

(c) *loadbearing* walls, columns and arches shall have a *fire-resistance rating* not less than that required for the supported assembly.

(3) In a *building* that contains *dwelling units* that have more than 1 *storey*, subject to the requirements of Sentence 3.3.4.2.(3), the floor assemblies, including floors over *basements*, that are entirely contained within these *dwelling units*, shall have a *fire-resistance rating* not less than 45 min but need not be constructed as *fire separations*.

(4) In a *building* in which there is no *dwelling unit* above another *dwelling unit*, the *fire-resistance rating* for floor assemblies entirely within the *dwelling unit* is waived.

3.2.2.48. Group C, up to 3 Storeys, Sprinklered

(1) A *building* classified as Group C is permitted to conform to Sentence (2) provided,

(a) except as permitted by Sentence 3.2.2.7.(1), the *building* is *sprinklered*,

(b) it is not more than 3 *storeys* in *building height*, and

(c) it has a *building area* not more than,

(i) 5 400 m^2 if 1 *storey* in *building height*,

(ii) 2 700 m^2 if 2 *storeys* in *building height*, or

(iii) 1 800 m^2 if 3 *storeys* in *building height*.

(2) The *building* referred to in Sentence (1) is permitted to be of *combustible construction* or *noncombustible construction* used singly or in combination, and,

(a) except as permitted by Sentences (3) and (4), floor assemblies shall be *fire separations* with a *fire-resistance rating* not less than 45 min,

(b) *mezzanines* shall have, if of *combustible construction* a *fire-resistance rating* not less than 45 min, and

(c) *loadbearing* walls, columns and arches shall have a *fire-resistance rating* not less than that required for the supported assembly.

(3) In a *building* that contains *dwelling units* that have more than 1 *storey*, subject to the requirements of Sentence 3.3.4.2.(3), the floor assemblies, including floors over *basements*, that are entirely contained within these *dwelling units*, shall have a *fire-resistance rating* not less than 45 min but need not be constructed as *fire separations*.

(4) In a *building* in which there is no *dwelling unit* above another *dwelling unit*, the *fire-resistance rating* for floor assemblies entirely within the *dwelling unit* is waived.

3.2.2.49. Group D, Any Height, Any Area

(1) Except as permitted by Articles 3.2.2.50. to 3.2.2.56., a *building* classified as Group D shall conform to Sentence (2).

(2) Except as permitted by Article 3.2.2.16., the *building* referred to in Sentence (1) shall be of *noncombustible construction*, and,

(a) except as permitted by Sentence 3.2.2.7.(1), the *building* shall be *sprinklered* if it is regulated by Subsection 3.2.6.,

(b) floor assemblies shall be *fire separations* with a *fire-resistance rating* not less than 2 h,

(c) *mezzanines* shall have a *fire-resistance rating* not less 1 h,

(d) if the *building* is not *sprinklered*, roof assemblies shall have a *fire-resistance rating* not less than 1 h, except that in a *building* not more than 1 *storey* in *building height* this requirement is waived, and

(e) *loadbearing* walls, columns and arches shall have a *fire-resistance rating* not less than that required for the supported assembly.

3.2.2.50. Group D, up to 6 Storeys

(1) A *building* classified as Group D is permitted to conform to Sentence (2) provided,

(a) it is not more than 6 *storeys* in *building height*, and

(b) it has a *building area* not more than the value in Table 3.2.2.50.

(2) The *building* referred to in Sentence (1) shall be of *noncombustible construction*, and,

(a) floor assemblies shall be *fire separations* with a *fire-resistance rating* not less than 1 h,

(b) *mezzanines* shall have a *fire-resistance rating* not less than 1 h,

(c) roof assemblies shall have a *fire-resistance rating* not less than 1 h, except that in a *building* not more than 1 *storey* in *building height* this requirement is waived, and

(d) *loadbearing* walls, columns and arches shall have a *fire-resistance rating* not less than that required for the supported assembly.

Table 3.2.2.50.
Maximum Building Area, Group D, up to 6 Storeys

Forming Part of Sentence 3.2.2.50.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
No. of *Storeys*	Maximum Area, m^2		
	Facing 1 *Street*	Facing 2 *Streets*	Facing 3 *Streets*
1	not limited	not limited	not limited
2	7 200	not limited	not limited
3	4 800	6 000	7 200
4	3 600	4 500	5 400
5	2 800	3 600	4 320
6	2 400	3 000	3 600

3.2.2.51. Group D, up to 6 Storeys, Sprinklered

(1) A *building* classified as Group D is permitted to conform to Sentence (2) provided,

(a) except as permitted by Sentence 3.2.2.7.(1), the *building* is *sprinklered*,

(b) it is not more than 6 *storeys* in *building height*, and

(c) it has a *building area*,

(i) that is not limited if the *building* is not more than 2 *storeys* in *building height*,

(ii) not more than 14 400 m^2 if 3 *storeys* in *building height*,

(iii) not more than 10 800 m^2 if 4 *storeys* in *building height*,

(iv) not more than 8 640 m^2 if 5 *storeys* in *building height*, or

(v) not more than 7 200 m^2 if 6 *storeys* in *building height*.

(2) Except as permitted by Article 3.2.2.16., the *building* referred to in Sentence (1) shall be of *noncombustible construction*, and,

(a) floor assemblies shall be *fire separations* with a *fire-resistance rating* not less than 1 h,

(b) *mezzanines* shall have a *fire-resistance rating* not less than 1 h, and

(c) *loadbearing* walls, columns and arches shall have a *fire-resistance rating* not less than that required for the supported assembly.

3.2.2.52. Group D, up to 4 Storeys, Sprinklered

(1) A *building* classified as Group D is permitted to conform to Sentence (2) provided,

(a) except as permitted by Sentence 3.2.2.7.(1), the *building* is *sprinklered*,

(b) it is not more than 4 *storeys* in *building height*, and

(c) it has a *building area* not more than 3 600 m^2.

(2) The *building* referred to in Sentence (1) is permitted to be of *combustible construction* or *noncombustible construction* used singly or in combination, and,

(a) floor assemblies shall be *fire separations* with a *fire-resistance rating* not less than 1 h,

(b) *mezzanines* shall have a *fire-resistance rating* not less than 1 h, and

(c) *loadbearing* walls, columns and arches shall have a *fire-resistance rating* not less than that required for the supported assembly.

3.2.2.53. Group D, up to 3 Storeys

(1) A *building* classified as Group D is permitted to conform to Sentence (2) provided,

(a) it is not more than 3 *storeys* in *building height*, and

(b) it has a *building area* not more than the value in Table 3.2.2.53.

(2) The *building* referred to in Sentence (1) is permitted to be of *combustible construction* or *noncombustible construction* used singly or in combination, and,

(a) floor assemblies shall be *fire separations* and, if of *combustible construction*, shall have a *fire-resistance rating* not less than 45 min,

(b) *mezzanines* shall have, if of *combustible construction*, a *fire-resistance rating* not less than 45 min,

(c) roof assemblies shall have, if of *combustible construction*, a *fire-resistance rating* not less than 45 min, except that in a *building* not more than 1 *storey* in *building height*, the *fire-resistance rating* is permitted to be waived provided the roof assembly is constructed as a *fire-retardant treated wood* roof system conforming to Article 3.1.14.1., and the *building area* is not more than,

  (i) 2 400 m^2 if facing one *street*,

  (ii) 3 000 m^2 if facing 2 *streets*, or

  (iii) 3 600 m^2 if facing 3 *streets*, and

(d) *loadbearing* walls, columns and arches supporting an assembly required to have a *fire-resistance rating* shall,

  (i) have a *fire-resistance rating* not less than 45 min, or

  (ii) be of *noncombustible construction*.

Table 3.2.2.53.
Maximum Building Area, Group D, up to 3 Storeys

Forming Part of Sentence 3.2.2.53.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
No. of *Storeys*	Maximum Area, m^2		
	Facing 1 *Street*	Facing 2 *Streets*	Facing 3 *Streets*
1	4 800	6 000	7 200
2	2 400	3 000	3 600
3	1 600	2 000	2 400

3.2.2.54. Group D, up to 3 Storeys, Sprinklered

(1) A *building* classified as Group D is permitted to conform to Sentence (2) provided,

(a) except as permitted by Sentence 3.2.2.7.(1), the *building* is *sprinklered*,

(b) it is not more than 3 *storeys* in *building height*, and

(c) it has a *building area* not more than,

  (i) 14 400 m^2 if 1 *storey* in *building height*,

  (ii) 7 200 m^2 if 2 *storeys* in *building height*, or

  (iii) 4 800 m^2 if 3 *storeys* in *building height*.

(2) The *building* referred to in Sentence (1) is permitted to be of *combustible construction* or *noncombustible construction* used singly or in combination, and,

(a) floor assemblies shall be *fire separations* and, if of *combustible construction*, shall have a *fire-resistance rating* not less than 45 min,

(b) *mezzanines* shall have, if of *combustible construction*, a *fire-resistance rating* not less than 45 min, and

(c) *loadbearing* walls, columns and arches supporting an assembly required to have a *fire-resistance rating* shall,

  (i) have a *fire-resistance rating* not less than 45 min, or

  (ii) be of *noncombustible construction*.

3.2.2.55. Group D, up to 2 Storeys

(1) A *building* classified as Group D is permitted to conform to Sentence (2) provided,

(a) it is not more than 2 *storeys* in *building height*, and

(b) it has a *building area* not more than the value in Table 3.2.2.55.

Table 3.2.2.55.
Maximum Building Area, Group D, up to 2 Storeys

Forming Part of Sentence 3.2.2.55.(1)

Column 1	Column 2	Column 3	Column 4
No. of *Storeys*	Maximum Area, m^2		
	Facing 1 *Street*	Facing 2 *Streets*	Facing 3 *Streets*
1	1 000	1 250	1 500
2	800	1 000)	1 200

(2) The *building* referred to in Sentence (1) is permitted to be of *combustible construction* or *noncombustible construction* used singly or in combination, and,

(a) floor assemblies shall be *fire separations* and, if of *combustible construction*, shall have a *fire-resistance rating* not less than 45 min, and

(b) *loadbearing* walls, columns and arches supporting an assembly required to have a *fire-resistance rating* shall,

  (i) have a *fire-resistance rating* not less than 45 min, or

  (ii) be of *noncombustible construction*.

3.2.2.56. Group D, up to 2 Storeys, Sprinklered

(1) A *building* classified as Group D is permitted to conform to Sentence (2) provided,

(a) except as permitted by Sentence 3.2.2.7.(1), the *building* is *sprinklered*,

(b) it is not more than 2 *storeys* in *building height*, and

(c) it has a *building area* not more than,

  (i) 3 000 m^2 if 1 *storey* in *building height*, or

  (ii) 2 400 m^2 if 2 *storeys* in *building height*.

(2) The *building* referred to in Sentence (1) is permitted to be of *combustible construction* or *noncombustible construction* used singly or in combination, and,

(a) floor assemblies shall be *fire separations* and, if of *combustible construction*, shall have a *fire-resistance rating* not less than 45 min, and

(b) *loadbearing* walls, columns and arches supporting an assembly required to have a *fire-resistance rating* shall,

  (i) have a *fire-resistance rating* not less than 45 min, or

  (ii) be of *noncombustible construction*.

3.2.2.57. Group E, Any Height, Any Area, Sprinklered

(1) Except as permitted by Articles 3.2.2.58. to 3.2.2.62., a *building* classified as Group E shall conform to Sentence (2).

(2) Except as permitted by Article 3.2.2.16., the *building* referred to in Sentence (1) shall be of *noncombustible construction*, and,

(a) except as permitted by Sentence 3.2.2.7.(1), the *building* shall be *sprinklered*,

(b) floor assemblies shall be *fire separations* with a *fire-resistance rating* not less than 2 h,

(c) *mezzanines* shall have a *fire-resistance rating* not less 1 h, and

(d) *loadbearing* walls, columns and arches shall have a *fire-resistance rating* not less than that required for the supported assembly.

3.2.2.58. Group E, up to 4 Storeys, Sprinklered

(1) A *building* classified as Group E is permitted to conform to Sentence (2) provided,

(a) except as permitted by Sentence 3.2.2.7.(1), the *building* is *sprinklered*,

(b) it is not more than 4 *storeys* in *building height*, and

(c) it has a *building area* not more than 1 800 m^2.

(2) The *building* referred to in Sentence (1) is permitted to be of *combustible construction* or *noncombustible construction* used singly or in combination, and,

(a) floor assemblies shall be *fire separations* with a *fire-resistance rating* not less than 1 h,

(b) *mezzanines* shall have a *fire-resistance rating* not less than 1 h, and

(c) *loadbearing* walls, columns and arches shall have a *fire-resistance rating* not less than that required for the supported assembly.

3.2.2.59. Group E, up to 3 Storeys

(1) A *building* classified as Group E is permitted to conform to Sentence (2) provided,

(a) it is not more than 3 *storeys* in *building height*, and

(b) it has a *building area* not more than the value in Table 3.2.2.59.

Table 3.2.2.59.
Maximum Building Area, Group E, up to 3 Storeys

Forming Part of Sentence 3.2.2.59.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
No. of *Storeys*	Maximum Area, m^2		
	Facing 1 *Street*	Facing 2 *Streets*	Facing 3 *Streets*
1	1 500	1 500	1 500
2	1 200	1 500	1 500
3	800	1 000	1 500

(2) The *building* referred to in Sentence (1) is permitted to be of *combustible construction* or *noncombustible construction* used singly or in combination, and,

(a) floor assemblies shall be *fire separations* with a *fire-resistance rating* not less than 45 min,

(b) *mezzanines* shall have, if of *combustible construction*, a *fire-resistance rating* not less than 45 min,

(c) roof assemblies shall have a *fire-resistance rating* not less than 45 min, except that in a *building* not more than 1 *storey* in *building height*, the *fire-resistance rating* is permitted to be waived provided the roof assembly is of *noncombustible construction* or is constructed as a *fire-retardant treated wood* roof system conforming to Article 3.1.14.1.,

(d) *loadbearing* walls, columns and arches supporting an assembly required to have a *fire-resistance rating* shall,

  (i) have a *fire-resistance rating* not less than 45 min, or

  (ii) be of *noncombustible construction*, and

(e) *loadbearing* walls, columns and arches supporting a *fire separation* shall have a *fire-resistance rating* not less than that required for the *fire separation*.

3.2.2.60. Group E, up to 3 Storeys, Sprinklered

(1) A *building* classified as Group E is permitted to conform to Sentence (2) provided,

(a) except as permitted by Sentence 3.2.2.7.(1), the *building* is *sprinklered*,

(b) it is not more than 3 *storeys* in *building height*, and

(c) it has a *building area* not more than,

  (i) 7 200 m^2 if 1 *storey* in *building height*,

  (ii) 3 600 m^2 if 2 *storeys* in *building height*, or

  (iii) 2 400 m^2 if 3 *storeys* in *building height*.

(2) The *building* referred to in Sentence (1) is permitted to be of *combustible construction* or *noncombustible construction* used singly or in combination, and,

(a) floor assemblies shall be *fire separations* with a *fire-resistance rating* not less than 45 min,

(b) *mezzanines* shall have, if of *combustible construction*, a *fire-resistance rating* not less than 45 min,

(c) *loadbearing* walls, columns and arches supporting an assembly required to have a *fire-resistance rating* shall,

  (i) have a *fire-resistance rating* not less than 45 min, or

  (ii) be of *noncombustible construction*, and

(d) *loadbearing* walls, columns and arches supporting a *fire separation* shall have a *fire-resistance rating* not less than that required for the *fire separation*.

3.2.2.61. Group E, up to 2 Storeys

(1) A *building* classified as Group E is permitted to conform to Sentence (2) provided,

(a) it is not more than 2 *storeys* in *building height*, and

(b) it has a *building area* not more than the value in Table 3.2.2.61.

Table 3.2.2.61.
Maximum Building Area, Group E, up to 2 Storeys

Forming Part of Sentence 3.2.2.61.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
No. of *Storeys*	Maximum Area, m^2		
	Facing 1 *Street*	Facing 2 *Streets*	Facing 3 *Streets*
1	1 000	1 250	1 500
2	600	750	900

(2) The *building* referred to in Sentence (1) is permitted to be of *combustible construction* or *noncombustible construction* used singly or in combination, and,

(a) floor assemblies shall be *fire separations* with a *fire-resistance rating* not less than 45 min, and

(b) *loadbearing* walls, columns and arches shall have a *fire-resistance rating* not less than that required for the supported assembly.

3.2.2.62. Group E, up to 2 Storeys, Sprinklered

(1) A *building* classified as Group E is permitted to conform to Sentence (2) provided,

(a) except as permitted by Sentence 3.2.2.7.(1), the *building* is *sprinklered*,

(b) it is not more than 2 *storeys* in *building height*, and

(c) it has a *building area* not more than,

(i) 3 000 m^2 if 1 *storey* in *building height*, or

(ii) 1 800 m^2 if 2 *storeys* in *building height*.

(2) The *building* referred to in Sentence (1) is permitted to be of *combustible construction* or *noncombustible construction* used singly or in combination, and,

(a) floor assemblies shall be *fire separations* with a *fire-resistance rating* not less than 45 min, and

(b) *loadbearing* walls, columns and arches shall have a *fire-resistance rating* not less than that required for the supported assembly.

3.2.2.63. Group F, Division 1, up to 4 Storeys, Sprinklered

(1) Except as permitted by Articles 3.2.2.64. to 3.2.2.66., a *building* classified as Group F, Division 1 shall conform to Sentence (2) provided,

(a) it is not more than 4 *storeys* in *building height*, and

(b) it has a *building area* not more than,

(i) 9 000 m^2 if 1 *storey* in *building height*,

(ii) 4 500 m^2 if 2 *storeys* in *building height*,

(iii) 3 000 m^2 if 3 *storeys* in *building height*, or

(iv) 2 250 m^2 if 4 *storeys* in *building height*.

(2) Except as permitted by Article 3.2.2.16., the *building* referred to in Sentence (1) shall be of *noncombustible construction*, and,

(a) except as permitted by Sentence 3.2.2.7.(1), the *building* shall be *sprinklered*,

(b) floor assemblies shall be *fire separations* with a *fire-resistance rating* not less than 2 h,

(c) *mezzanines* shall have a *fire-resistance rating* not less than 1 h, and

(d) *loadbearing* walls, columns and arches shall have a *fire-resistance rating* not less than that required for the supported assembly.

3.2.2.64. Group F, Division 1, up to 3 Storeys, Sprinklered

(1) A *building* classified as Group F, Division 1 is permitted to conform to Sentence (2) provided,

(a) except as permitted by Sentence 3.2.2.7.(1), the *building* is *sprinklered*,

(b) it is not more than 3 *storeys* in *building height*, and

(c) it has a *building area* not more than,

  (i) 3 600 m^2 if 1 *storey* in *building height*,

  (ii) 1 800 m^2 if 2 *storeys* in *building height*, or

  (iii) 1 200 m^2 if 3 *storeys* in *building height*.

(2) The *building* referred to in Sentence (1) is permitted to be of *heavy timber construction* or *noncombustible construction* used singly or in combination, and,

(a) floor assemblies shall be *fire separations* with a *fire-resistance rating* not less than 45 min,

(b) *loadbearing* walls, columns and arches shall have a *fire-resistance rating* not less than that required for the supported assembly.

3.2.2.65. Group F, Division 1, up to 2 Storeys, Sprinklered

(1) A *building* classified as Group F, Division 1 is permitted to conform to Sentence (2) provided,

(a) except as permitted by Sentence 3.2.2.7.(1), the *building* is *sprinklered*,

(b) it is not more than 2 *storeys* in *building height*, and

(c) it has a *building area* not more than,

  (i) 2 400 m^2 if 1 *storey* in *building height*, or

  (ii) 1 200 m^2 if 2 *storeys* in *building height*.

(2) The *building* referred to in Sentence (1) is permitted to be of *combustible construction* or *noncombustible construction* used singly or in combination, and,

(a) floor assemblies shall be *fire separations* and, if of *combustible construction*, shall have a *fire-resistance rating* not less than 45 min,

(b) *loadbearing* walls, columns and arches supporting an assembly required to have a *fire-resistance rating* shall,

  (i) have a *fire-resistance rating* not less than 45 min, or

  (ii) be of *noncombustible construction*.

3.2.2.66. Group F, Division 1, One Storey

(1) A *building* classified as Group F, Division 1 is permitted to be of *combustible construction* or *noncombustible construction* used singly or in combination provided,

(a) it is not more than 1 *storey* in *building height*, and

(b) it has a *building area* not more than 800 m^2.

3.2.2.67. Group F, Division 2, Any Height, Any Area, Sprinklered

(1) Except as permitted by Articles 3.2.2.68. to 3.2.2.72., a *building* classified as Group F, Division 2 shall conform to Sentence (2).

(2) Except as permitted by Article 3.2.2.16., the *building* referred to in Sentence (1) shall be of *noncombustible construction*, and,

(a) except as permitted by Sentence 3.2.2.7.(1), the *building* shall be *sprinklered*,

(b) floor assemblies shall be *fire separations* with a *fire-resistance rating* not less than 2 h,

(c) *mezzanines* shall have a *fire-resistance rating* not less 1 h, and

(d) *loadbearing* walls, columns and arches shall have a *fire-resistance rating* not less than that required for the supported assembly.

3.2.2.68. Group F, Division 2, up to 6 Storeys

(1) A *building* classified as Group F, Division 2 is permitted to conform to Sentence (2) provided,

(a) it is not more than 6 *storeys* in *building height*, and

(b) it has a *building area* not more than the value in Table 3.2.2.68.A. or Table 3.2.2.68.B.

(2) Except as permitted by Article 3.2.2.16., the *building* referred to in Sentence (1) shall be of *noncombustible construction*, and,

(a) floor assemblies shall be *fire separations* with a *fire-resistance rating* not less than 2 h,

(b) *mezzanines* shall have a *fire-resistance rating* not less than 1 h,

(c) if the *building* is not *sprinklered*, roof assemblies shall have a *fire-resistance rating* not less than 1 h, and

(d) *loadbearing* walls, columns and arches shall have a *fire-resistance rating* not less than that required for the supported assembly.

Table 3.2.2.68.A.
Maximum Building Area, Group F, Division 2, up to 6 Storeys

Forming Part of Sentence 3.2.2.68.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
No. of *Storeys*	Maximum Area, m²		
	Facing 1 *Street*	Facing 2 *Streets*	Facing 3 *Streets*
1	9 000	11 250	13 500
2	4 500	5 625	6 750
3	3 000	3 750	4 500
4	2 250	2 810	3 375
5	1 800	2 250	2 700
6	1 500	1 875	2 250

Table 3.2.2.68.B.
Maximum Building Area, Group F, Division 2, up to 6 Storeys, Sprinklered

Forming Part of Sentence 3.2.2.68.(1)

COLUMN 1	COLUMN 2
No. of *Storeys*	Maximum Area, m²
1	27 000
2	13 500
3	9 000
4	6 750
5	5 400
6	4 500

3.2.2.69. Group F, Division 2, up to 4 Storeys, Increased Area

(1) A *building* classified as Group F, Division 2 is permitted to conform to Sentence (2) provided,

(a) it is not more than 4 *storeys* in *building height*, and

(b) it has a *building area* not more than the value in Table 3.2.2.69.A. or Table 3.2.2.69.B.

(2) Except as permitted by Article 3.2.2.16., the *building* referred to in Sentence (1) shall be of *noncombustible construction*, and,

(a) floor assemblies shall be *fire separations* with a *fire-resistance rating* not less than 1 h,

(b) *mezzanines* shall have a *fire-resistance rating* not less than 1 h,

(c) if the *building* is not *sprinklered*, roof assemblies shall have a *fire-resistance rating* not less than 1 h, and

(d) *loadbearing* walls, columns and arches shall have a *fire-resistance rating* not less than that required for the supported assembly.

Table 3.2.2.69.A.
Maximum Building Area, Group F, Division 2, up to 4 Storeys, Increased Area

Forming Part of Sentence 3.2.2.69.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
No. of *Storeys*	Maximum Area, m^2		
	Facing 1 *Street*	Facing 2 *Streets*	Facing 3 *Streets*
1	6 000	7 500	9 000
2	3 000	3 750	4 500
3	2 000	2 500	3 000
4	1 500	1 875	2 250

Table 3.2.2.69.B.
Maximum Building Area, Group F, Division 2, up to 4 Storeys, Increased Area, Sprinklered

Forming Part of Sentence 3.2.2.69.(1)

COLUMN 1	COLUMN 2
No. of *Storeys*	Maximum Area, m^2
1	18 000
2	9 000
3	6 000
4	4 500

3.2.2.70. Group F, Division 2, up to 4 Storeys

(1) A *building* classified as Group F, Division 2 is permitted to conform to Sentence (2) provided,

(a) it is not more than 4 *storeys* in *building height*, and

(b) it has a *building area* not more than the value in Table 3.2.2.70.A. or Table 3.2.2.70.B.

(2) The *building* referred to in Sentence (1) shall be of *combustible construction* or *noncombustible construction* used singly or in combination, and

(a) floor assemblies shall be *fire separations* with a *fire-resistance rating* not less than 45 min,

(b) *mezzanines* shall have, if of *combustible construction*, a *fire-resistance rating* not less than 45 min,

(c) if the *building* is not *sprinklered*, roof assemblies shall have, if of *combustible construction*, a *fire-resistance rating* not less than 45 min, except that in *buildings* not more than 1 *storey* in *building height*, the *fire-resistance rating* is permitted to be waived provided the roof assembly is constructed as a *fire-retardant treated wood* roof system conforming to Article 3.1.14.1., and the *building area* is not more than,

(i) 1 600 m^2 if facing 1 *street*,

(ii) 2 000 m^2 if facing 2 *streets*, or

(iii) 2 400 m^2 if facing 3 *streets*,

(d) *loadbearing* walls, columns and arches supporting an assembly required to have a *fire-resistance rating* shall,

(i) have a *fire-resistance rating* not less than 45 min, or

(ii) be of *noncombustible construction*, and

(e) *loadbearing* walls, columns and arches supporting a *fire separation* shall have a *fire-resistance rating* not less than that required for the supported assembly.

Table 3.2.2.70.A.
Maximum Building Area, Group F, Division 2, up to 4 Storeys

Forming Part of Sentence 3.2.2.70.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
No. of *Storeys*	Maximum Area, m^2		
	Facing 1 *Street*	Facing 2 *Streets*	Facing 3 *Streets*
1	3 200	4 000	4 800
2	1 600	2 000	2 400
3	1 070	1 340	1 600
4	800	1 000	1 200

Table 3.2.2.70.B.
Maximum Building Area, Group F, Division 2, up to 4 Storeys, Increased Area, Sprinklered

Forming Part of Sentence 3.2.2.70.(1)

COLUMN 1	COLUMN 2
No. of *Storeys*	Maximum Area, m^2
1	9 600
2	4 800
3	3 200
4	2 400

3.2.2.71. Group F, Division 2, up to 2 Storeys

(1) A *building* classified as Group F, Division 2 is permitted to conform to Sentence (2) provided,

(a) it is not more than 2 *storeys* in *building height*, and

(b) it has a *building area* not more than the value in Table 3.2.2.71.

Table 3.2.2.71.
Maximum Building Area, Group F, Division 2, up to 2 Storeys

Forming Part of Sentence 3.2.2.71.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
No. of *Storeys*	Maximum Area, m^2		
	Facing 1 *Street*	Facing 2 *Streets*	Facing 3 *Streets*
1	1 000	1 250	1 500
2	600	750	900

(2) The *building* referred to in Sentence (1) is permitted to be of *combustible construction* or *noncombustible construction* used singly or in combination, and,

(a) floor assemblies shall be *fire separations* and, if of *combustible construction*, shall have a *fire-resistance rating* not less than 45 min, and

(b) *loadbearing* walls, columns and arches supporting an assembly required to have a *fire-resistance rating* shall,

(i) have a *fire-resistance rating* not less than 45 min, or

(ii) be of *noncombustible construction*.

3.2.2.72. Group F, Division 2, up to 2 Storeys, Sprinklered

(1) A *building* classified as Group F, Division 2 is permitted to conform to Sentence (2) provided,

(a) except as permitted by Sentence 3.2.2.7.(1), the *building* is *sprinklered*,

(b) it is not more than 2 *storeys* in *building height*, and

(c) it has a *building area* not more than,

(i) 4 500 m^2 if 1 *storey* in *building height*, or

(ii) 1 800 m^2 if 2 *storeys* in *building height*.

(2) The *building* referred to in Sentence (1) is permitted to be of *combustible construction* or *noncombustible construction* used singly or in combination, and,

(a) floor assemblies shall be *fire separations* and, if of *combustible construction*, shall have a *fire-resistance rating* not less than 45 min, and

(b) *loadbearing* walls, columns and arches supporting an assembly required to have a fire-resistance rating shall,

(i) have a *fire-resistance rating* not less than 45 min, or

(ii) be of *noncombustible construction*.

3.2.2.73. Group F, Division 3, Any Height, Any Area

(1) Except as permitted by Articles 3.2.2.74. to 3.2.2.83., a *building* classified as Group F, Division 3 shall conform to Sentence (2).

(2) Except as permitted by Article 3.2.2.16., the *building* referred to in Sentence (1) shall be of *noncombustible construction*, and,

(a) except as permitted by Sentence 3.2.2.7.(1), the *building* shall be *sprinklered* if it is regulated by Subsection 3.2.6.,

(b) floor assemblies shall be *fire separations* with a *fire-resistance rating* not less than 2 h, except that floor assemblies are permitted to be *fire separations* with a *fire-resistance rating* not less than 1 h in a *storage garage* with all *storeys* constructed as *open-air storeys*,

(c) *mezzanines* shall have a *fire-resistance rating* not less 1 h,

(d) if the *building* is not *sprinklered*, roof assemblies shall have a *fire-resistance rating* not less than 1 h, and

(e) *loadbearing* walls, columns and arches shall have a *fire-resistance rating* not less than that required for the supported assembly.

3.2.2.74. Group F, Division 3, up to 6 Storeys

(1) A *building* classified as Group F, Division 3 is permitted to conform to Sentence (2) provided,

(a) it is not more than 6 *storeys* in *building height*, and

(b) it has a *building area* not more than the value in Table 3.2.2.74.

(2) The *building* referred to in Sentence (1) shall be of *noncombustible construction*, and,

(a) floor assemblies shall be *fire separations* with a *fire-resistance rating* not less than 1 h,

(b) *mezzanines* shall have a *fire-resistance rating* not less than 1 h,

(c) roof assemblies shall have a *fire-resistance rating* not less than 1 h, and

(d) *loadbearing* walls, columns and arches shall have a *fire-resistance rating* not less than that required for the supported assembly.

Table 3.2.2.74.
Maximum Building Area, Group F, Division 3, up to 6 Storeys

Forming Part of Sentence 3.2.2.74.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
No. of *Storeys*	Maximum Area, m²		
	Facing 1 *Street*	Facing 2 *Streets*	Facing 3 *Streets*
1	not limited	not limited	not limited
2	7 200	9 000	10 800
3	4 800	6 000	7 200
4	3 600	4 500	5 400
5	2 880	3 600	4 320
6	2 400	3 000	3 600

3.2.2.75. Group F, Division 3, up to 6 Storeys, Sprinklered

(1) A *building* classified as Group F, Division 3 is permitted to conform to Sentence (2) provided,

(a) except as permitted by Sentence 3.2.2.7.(1), the *building* is *sprinklered*,

(b) it is not more than 6 *storeys* in *building height*, and

(c) it has a *building area*,

(i) that is not limited if the *building* is not more than 1 *storey* in *building height*,

(ii) not more than 21 600 m^2 if 2 *storeys* in *building height*,

(iii) not more than 14 400 m^2 if 3 *storeys* in *building height*,

(iv) not more than 10 800 m^2 if 4 *storeys* in *building height*,

(v) not more than 8 640 m^2 if 5 *storeys* in *building height*, or

(vi) not more than 7 200 m^2 if 6 *storeys* in *building height*.

(2) Except as permitted by Article 3.2.2.16., the *building* referred to in Sentence (1) shall be of *noncombustible construction*, and,

(a) floor assemblies shall be *fire separations* with a *fire-resistance rating* not less than 1 h,

(b) *mezzanines* shall have a *fire-resistance rating* not less than 1 h, and

(c) *loadbearing* walls, columns and arches shall have a *fire-resistance rating* not less than that required for the supported assembly.

3.2.2.76. Group F, Division 3, up to 4 Storeys

(1) A *building* classified as Group F, Division 3 is permitted to conform to Sentence (2) provided,

(a) it is not more than 4 *storeys* in *building height*, and

(b) it has a *building area* not more than the value in Table 3.2.2.76.

Table 3.2.2.76.
Maximum Building Area, Group F, Division 3, up to 4 Storeys

Forming Part of Sentence 3.2.2.76.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
No. of *Storeys*	Maximum Area, m²		
	Facing 1 *Street*	Facing 2 *Streets*	Facing 3 *Streets*
1	4 800	6 000	7 200
2	2 400	3 000	3 600
3	1 600	2 000	2 400
4	1 200	1 500	1 800

(2) The *building* referred to in Sentence (1) is permitted to be of *combustible construction* or *noncombustible construction* used singly or in combination, and,

(a) floor assemblies shall be *fire separations* and, if of *combustible construction*, shall have a *fire-resistance rating* not less than 45 min,

(b) *mezzanines* shall have, if of *combustible construction*, a *fire-resistance rating* not less than 45 min,

(c) roof assemblies shall have, if of *combustible construction*, a *fire-resistance rating* not less than 45 min, except that in a *building* not more than 1 *storey* in *building height*, the *fire-resistance rating* is permitted to be waived provided the roof assembly is constructed as a *fire-retardant treated wood* roof system conforming to Article 3.1.14.1., and the *building area* is not more than,

(i) 2 400 m² if facing 1 *street*,

(ii) 3 000 m² if facing 2 *streets*, or

(iii) 3 600 m² if facing 3 *streets*, and

(d) *loadbearing* walls, columns and arches supporting an assembly required to have a *fire-resistance rating* shall,

(i) have a *fire-resistance rating* not less than 45 min, or

(ii) be of *noncombustible construction*.

3.2.2.77. Group F, Division 3, up to 4 Storeys, Sprinklered

(1) A *building* classified as Group F, Division 3 is permitted to conform to Sentence (2) provided,

(a) except as permitted by Sentence 3.2.2.7.(1), the *building* is *sprinklered*,

(b) it is not more than 4 *storeys* in *building height*, and

(c) it has a *building area* not more than,

(i) 14 400 m² if 1 *storey* in *building height*,

(ii) 7 200 m² if 2 *storeys* in *building height*,

(iii) 4 800 m² if 3 *storeys* in *building height*, or

(iv) 3 600 m² if 4 *storeys* in *building height*.

(2) The *building* referred to in Sentence (1) is permitted to be of *combustible construction* or *noncombustible construction* used singly or in combination, and,

(a) floor assemblies shall be *fire separations* and, if of *combustible construction*, shall have a *fire-resistance rating* not less than 45 min,

(b) *mezzanines* shall have, if of *combustible construction*, a *fire-resistance rating* not less than 45 min, and

(c) *loadbearing* walls, columns and arches supporting an assembly required to have a *fire-resistance rating* shall,

(i) have a *fire-resistance rating* not less than 45 min, or

(ii) be of *noncombustible construction*.

3.2.2.78. Group F, Division 3, up to 2 Storeys

(1) A *building* classified as Group F, Division 3 is permitted to conform to Sentence (2) provided,

(a) it is not more than 2 *storeys* in *building height*, and

(b) it has a *building area* not more than the value in Table 3.2.2.78.

(2) The *building* referred to in Sentence (1) is permitted to be of *combustible construction* or *noncombustible construction* used singly or in combination, and,

(a) floor assemblies shall be *fire separations* and, if of *combustible construction*, shall have a *fire-resistance rating* not less than 45 min,

(b) *loadbearing* walls, columns and arches supporting an assembly required to have a *fire-resistance rating* shall,

  (i) have a *fire-resistance rating* not less than 45 min, or

  (ii) be of *noncombustible construction*.

Table 3.2.2.78.
Maximum Building Area, Group F, Division 3, up to 2 Storeys

Forming Part of Sentence 3.2.2.78.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
No. of *Storeys*	Maximum Area, m²		
	Facing 1 *Street*	Facing 2 *Streets*	Facing 3 *Streets*
1	1 600	2 000	2 400
2	800	1 000	1 200

3.2.2.79. Group F, Division 3, up to 2 Storeys, Sprinklered

(1) A *building* classified as Group F, Division 3 is permitted to conform to Sentence (2) provided,

(a) except as permitted by Sentence 3.2.2.7.(1), the *building* is *sprinklered*,

(b) it is not more than 2 *storeys* in *building height*, and

(c) it has a *building area* not more than,

  (i) 7 200 m^2 if 1 *storey* in *building height*, or

  (ii) 2 400 m^2 if 2 *storeys* in *building height*.

(2) The *building* referred to in Sentence (1) is permitted to be of *combustible construction* or *noncombustible construction* used singly or in combination, and,

(a) floor assemblies shall be *fire separations* and, if of *combustible construction*, shall have a *fire-resistance rating* not less than 45 min,

(b) *loadbearing* walls, columns and arches supporting an assembly required to have a *fire-resistance rating* shall,

  (i) have a *fire-resistance rating* not less than 45 min, or

  (ii) be of *noncombustible construction*.

3.2.2.80. Group F, Division 3, One Storey

(1) A *building* classified as Group F, Division 3 is permitted to be of *heavy timber construction* or *noncombustible construction* used singly or in combination provided,

(a) it is not more than 1 *storey* in *building height*, and

(b) it has a *building area* is not more than,

  (i) 5 600 m^2 if facing 1 *street*,

  (ii) 7 000 m^2 if facing 2 *streets*, or

  (iii) 8 400 m^2 if facing 3 *streets*.

3.2.2.81. Group F, Division 3, One Storey, Sprinklered

(1) A *building* classified as Group F, Division 3 is permitted to be of *heavy timber construction* or *noncombustible construction* used singly or in combination provided,

(a) except as permitted by Sentence 3.2.2.7.(1), the *building* is *sprinklered*,

(b) it is not more than 1 *storey* in *building height*, and

(c) it has a *building area* not more than 16 800 m^2.

3.2.2.82. Group F, Division 3, One Storey, Any Area, Low Fire Load Occupancy

(1) A *building* classified as Group F, Division 3 is permitted to conform to Sentence (2) provided it is,

(a) not more than 1 *storey* in *building height*,

(b) used solely for low *fire load occupancies* such as,

  (i) power generating plants, or

  (ii) plants for the manufacture or storage of *noncombustible* materials, and

(c) not limited in *building area*.

(2) The *building* referred to in Sentence (1) shall be of *noncombustible construction*.

3.2.2.83. Group F, Division 3, Storage Garages up to 22 m High

(1) A *building* used as a *storage garage* with all *storeys* constructed as *open-air storeys* and having no other *occupancy* above it is permitted to have its floor, wall, ceiling and roof assemblies constructed without a *fire-resistance rating* provided it is,

(a) of *noncombustible construction*,

(b) not more than 22 m high, measured between *grade* and the ceiling level of the top *storey*,

(c) not more than 10 000 m^2 in *building area*, and

(d) designed so that every portion of each *floor area* is within 60 m of an exterior wall opening.

3.2.3. Spatial Separation and Exposure Protection

3.2.3.1. Limiting Distance and Area of Unprotected Openings

(1) Except as permitted by Articles 3.2.3.10. to 3.2.3.12., the area of *unprotected openings* in an *exposing building face* for the applicable *limiting distance* shall be not more than the value determined in accordance with,

(a) Table 3.2.3.1.A. or Table 3.2.3.1.B. for an *exposing building face* conforming to Article 3.2.3.2. of a *building* or *fire compartment* that is not *sprinklered*, or

(b) Table 3.2.3.1.C. or Table 3.2.3.1.D. for an *exposing building face* conforming to Article 3.2.3.2. of a *sprinklered fire compartment* that is part of a *building* that is *sprinklered* in conformance with Section 3.2.

(2) The area of the *unprotected openings* in an *exposing building face* shall be the aggregate area of *unprotected openings* expressed as a percentage of the area of the *exposing building face* in Table 3.2.3.1.A., Table 3.2.3.1.B., Table 3.2.3.1.C. or Table 3.2.3.1.D.

(3) For the purpose of determining the type of construction and cladding and the *fire-resistance rating* of an exterior wall,

(a) the *exposing building face* shall be taken as the projection of the exterior wall onto a vertical plane located so that no portion of the exterior wall of the *building* or of a *fire compartment*, if the *fire compartment* complies with the requirements of Article 3.2.3.2., is between the vertical plane and the line to which the *limiting distance* is measured, and

(b) the area of *unprotected openings* shall be determined from Table 3.2.3.1.A., Table 3.2.3.1.B., Table 3.2.3.1.C. or Table 3.2.3.1.D.

(4) For the purpose of determining the actual percentage of *unprotected openings* permitted in an exterior wall, the location of the *exposing building face* is permitted to be taken at a vertical plane located so that there are no *unprotected openings* between the vertical plane and the line to which the *limiting distance* is measured.

(5) If a *building* has any *storey* that is not *sprinklered* and fire fighting facilities cannot reach it within 10 min of the alarm being received, the required *limiting distance* shall be doubled.

(6) If the surface temperature on the unexposed surface of a wall assembly exceeds the temperature limit of a standard fire test as permitted by Article 3.1.7.2., an allowance shall be made for the radiation from the hot unexposed wall surface by adding an equivalent area of *unprotected opening* to the area of actual openings as follows:

$$A_C = A + (A_F \times F_{EO})$$

where,

A_C = corrected area of *unprotected openings* including actual and equivalent openings,

A = actual area of *unprotected openings*,

A_F = area of exterior surface of the *exposing building face*, exclusive of openings, on which the temperature limit of the standard test is exceeded, and

F_{EO} = an equivalent opening factor derived from the following expression:

$$F_{EO} = \frac{(T_u + 273)^4}{(T_e + 273)^4}$$

where,

T_u = average temperature in degrees Celsius of the unexposed wall surface at the time the required *fire-resistance rating* is reached under test conditions,

T_e = 892°C for a *fire-resistance rating* not less than 45 min, 927°C for a *fire-resistance rating* not less than 1 h, and 1 010°C for a *fire-resistance rating* not less than 2 h.

(7) Unless a *closure* used to protect an opening in an *exposing building face* has a protective performance equivalent to that required for the wall assembly in which it is located, an equivalent area of *unprotected opening*, determined in accordance with the procedures of Sentence (6) shall be added to the greater of,

(a) the actual area of *unprotected openings*, or

(b) the corrected area of *unprotected openings*.

Table 3.2.3.1.A.

Unprotected Opening Limits for a Building or Fire Compartment that is not Sprinklered

Forming Part of Article 3.2.3.1.

Exposing Building Face		Area of *Unprotected Openings* for Groups A, C, D, and F, Division 3 *Occupancies*, %																									
Maximum Area, m^2	Ratio (L/H or H/L)(1)	*Limiting Distance*, m																									
		0	1.2	1.5	2	2.5	3	4	5	6	7	8	9	10	11	12	13	14	16	18	20	25	30	35	40	45	50
10	Less than 3:1	0	8	10	18	29	46	91	100																		
	3:1 to 10:1	0	11	12	21	33	50	96	100																		
	over 10:1	0	11	18	32	48	68	100																			
15	Less than 3:1	0	7	9	14	22	33	63	100																		
	3:1 to 10:1	0	8	10	17	25	37	67	100																		
	over 10:1	0	10	15	26	39	53	87	100																		
20	Less than 3:1	0	7	9	12	18	26	49	81	100																	
	3:1 to 10:1	0	8	10	15	21	30	53	85	100																	
	over 10:1	0	9	14	23	33	45	72	100																		
25	Less than 3:1	0	7	8	11	16	23	41	66	98	100																
	3:1 to 10:1	0	8	9	13	19	26	45	70	100																	
	over 10:1	0	9	13	21	30	39	62	90	100																	
30	Less than 3:1	0	7	8	11	15	20	35	56	83	100																
	3:1 to 10:1	0	7	9	12	17	23	39	61	88	100																
	over 10:1	0	8	12	19	27	36	56	79	100																	
40	Less than 3:1	0	7	8	10	13	17	28	44	64	89	100															
	3:1 to 10:1	0	7	8	11	15	20	32	48	69	93	100															
	over 10:1	0	8	11	17	24	31	47	66	88	100																
50	Less than 3:1	0	7	8	9	12	15	24	37	53	72	96	100														
	3:1 to 10:1	0	7	8	10	14	18	28	41	57	77	100															
	over 10:1	0	8	10	15	21	28	41	57	76	97	100															
60	Less than 3:1	0	7	8	9	11	14	21	32	45	62	81	100														
	3:1 to 10:1	0	7	8	10	13	16	25	36	49	66	85	100														
	over 10:1	0	8	10	14	20	25	38	51	67	85	100															
80	Less than 3:1	0	7	7	8	10	12	18	26	36	48	62	79	98	100												
	3:1 to 10:1	0	7	8	9	11	14	21	29	40	52	67	84	100													
	over 10:1	0	8	9	13	17	22	32	44	56	70	86	100														

Exposing Building Face		Area of *Unprotected Openings* for Groups A, C, D, and F, Division 3 *Occupancies*, %																									
Maximum Area, m^2	Ratio (L/H or H/L)[1]	*Limiting Distance*, m																									
		0	1.2	1.5	2	2.5	3	4	5	6	7	8	9	10	11	12	13	14	16	18	20	25	30	35	40	45	50
100	Less than 3:1	0	7	7	8	9	11	16	22	30	40	51	65	80	97	100											
	3:1 to 10:1	0	7	8	9	11	13	18	25	34	44	56	69	84	100												
	over 10:1	0	7	9	12	16	20	29	39	49	61	74	89	100													
150	Less than 3:1	0	7	7	8	9	10	13	17	22	29	37	46	56	67	79	93	100									
	3:1 to 10:1	0	7	7	8	10	11	15	20	26	33	41	50	60	71	84	97	100									
	over 10:1	0	7	8	11	13	17	24	31	39	48	57	68	79	91	100											
250	Less than 3:1	0	7	7	7	8	9	10	13	16	20	25	30	36	43	51	59	68	87	100							
	3:1 to 10:1	0	7	7	8	9	10	12	15	19	24	28	34	40	47	55	63	72	92	100							
	over 10:1	0	7	8	9	11	14	19	24	30	36	43	50	57	65	73	82	92	100								
350	Less than 3:1	0	7	7	7	8	8	9	11	14	16	20	24	28	33	38	44	50	64	81	99	100					
	3:1 to 10:1	0	7	7	8	9	9	11	13	16	19	23	27	32	37	42	48	55	69	85	100						
	over 10:1	0	7	8	9	10	12	16	21	25	30	36	41	47	53	59	66	73	88	100							
500	Less than 3:1	0	7	7	7	7	8	9	10	12	14	16	19	22	25	29	33	37	47	59	71	100					
	3:1 to 10:1	0	7	7	7	8	8	10	12	14	16	19	22	25	29	33	37	41	52	63	76	100					
	over 10:1	0	7	7	8	9	11	14	18	22	25	30	34	38	43	48	53	58	70	82	96	100					
1 000	Less than 3:1	0	7	7	7	7	7	8	9	9	10	12	13	14	16	18	20	22	27	33	39	58	82	100			
	3:1 to 10:1	0	7	7	7	7	8	9	10	11	12	14	15	17	19	21	23	26	31	37	43	63	86	100			
	over 10:1	0	7	7	8	8	9	11	13	16	19	21	24	27	30	33	36	39	46	53	60	82	100				
2 000	Less than 3:1	0	7	7	7	7	7	7	8	8	9	9	10	11	12	13	14	15	17	20	23	33	44	58	74	93	100
	3:1 to 10:1	0	7	7	7	7	7	8	8	9	10	11	12	13	14	15	16	17	20	23	27	37	49	63	79	97	100
	over 10:1	0	7	7	7	8	8	9	11	12	14	16	18	19	21	23	25	27	32	36	40	53	66	82	99	100	

Note to Table 3.2.3.1.A.:

[1] Apply whichever is greater,

L = Length of *exposing building face*,

H = Height of *exposing building face*.

Table 3.2.3.1.B.

Unprotected Opening Limits for a Building or Fire Compartment that is not Sprinklered

Forming Part of Article 3.2.3.1.

Exposing Building Face		*Area of Unprotected Openings* for Groups E and F, Division 1 and 2 *Occupancies*, %																													
Maximum Area, m²	Ratio (L/H or H/L)[1]	*Limiting Distance*, m																													
		0	1.2	1.5	2	2.5	3	4	5	6	7	8	9	10	11	12	13	14	16	18	20	25	30	35	40	45	50	55	60	65	70
10	Less than 3:1	0	4	5	9	15	23	46	77	100																					
	3:1 to 10:1	0	4	6	10	17	25	48	79	100																					
	over 10:1	0	5	9	16	24	34	58	91	100																					
15	Less than 3:1	0	4	5	7	11	16	32	53	79	100																				
	3:1 to 10:1	0	4	5	8	13	18	34	55	82	100																				
	over 10:1	0	5	8	13	19	26	43	66	93	100																				
20	Less than 3:1	0	4	4	6	9	13	25	40	61	85	100																			
	3:1 to 10:1	0	4	5	7	11	15	27	43	63	87	100																			
	over 10:1	0	5	7	11	17	22	36	53	74	99	100																			
25	Less than 3:1	0	4	4	6	8	11	20	33	49	69	92	100																		
	3:1 to 10:1	0	4	5	7	9	13	22	35	51	71	94	100																		
	over 10:1	0	4	6	10	15	20	31	45	62	82	100																			
30	Less than 3:1	0	4	4	5	7	10	18	28	42	58	77	100																		
	3:1 to 10:1	0	4	4	6	9	12	20	30	44	60	80	100																		
	over 10:1	0	4	6	10	14	18	28	40	54	71	91	100																		
40	Less than 3:1	0	4	4	5	6	8	14	22	32	44	59	76	94	100																
	3:1 to 10:1	0	4	4	6	8	10	16	24	34	47	61	78	97	100																
	over 10:1	0	4	5	8	12	15	23	33	44	57	72	89	100																	
50	Less than 3:1	0	4	4	5	6	7	12	18	26	36	48	61	76	93	100															
	3:1 to 10:1	0	4	4	5	7	9	14	20	29	38	50	63	79	95	100															
	over 10:1	0	4	5	8	11	14	21	29	38	48	61	74	90	100																
60	Less than 3:1	0	4	4	4	5	7	11	16	23	31	40	52	64	78	94	100														
	3:1 to 10:1	0	4	4	5	6	8	12	18	25	33	43	54	66	81	96	100														
	over 10:1	0	4	5	7	10	13	19	26	34	43	53	64	77	92	100															
80	Less than 3:1	0	4	4	4	5	6	9	13	18	24	31	40	49	60	71	84	98	100												
	3:1 to 10:1	0	4	4	5	6	7	10	15	20	26	33	42	51	62	74	86	100													
	over 10:1	0	4	5	6	9	11	16	22	28	35	43	52	62	73	85	98	100													
100	Less than 3:1	0	4	4	4	5	5	8	11	15	20	26	32	40	48	58	68	79	100												
	3:1 to 10:1	0	4	4	4	5	6	9	13	17	22	28	35	42	51	60	70	81	100												
	over 10:1	0	4	4	6	8	10	14	19	25	31	37	44	52	61	71	81	92	100												
150	Less than 3:1	0	4	4	4	4	5	6	8	11	14	18	23	28	33	40	46	54	70	89	100										
	3:1 to 10:1	0	4	4	4	5	6	8	10	13	16	20	25	30	36	42	49	56	73	92	100										
	over 10:1	0	4	4	5	7	8	12	16	20	24	29	34	39	46	52	59	67	84	100											
250	Less than 3:1	0	4	4	4	4	4	5	7	8	10	12	15	18	22	25	29	34	44	55	68	100									
	3:1 to 10:1	0	4	4	4	4	5	6	8	10	12	14	17	20	24	27	32	36	46	57	70	100									
	over 10:1	0	4	4	5	6	7	9	12	15	18	21	25	28	32	37	41	46	56	68	81	100									

Exposing Building Face		*Area of Unprotected Openings* for Groups E and F, Division 1 and 2 *Occupancies*, %																													
Maximum Area, m^2	Ratio (L/H or H/L)[1]	*Limiting Distance*, m																													
		0	1.2	1.5	2	2.5	3	4	5	6	7	8	9	10	11	12	13	14	16	18	20	25	30	35	40	45	50	55	60	65	70
350	Less than 3:1	0	4	4	4	4	4	5	6	7	8	10	12	14	16	19	22	25	32	40	49	77	100								
	3:1 to 10:1	0	4	4	4	4	4	5	7	8	10	12	14	16	18	21	24	27	34	43	52	79	100								
	over 10:1	0	4	4	4	5	6	8	10	13	15	18	21	23	26	30	33	36	44	53	62	90	100								
500	Less than 3:1	0	4	4	4	4	4	4	5	6	7	8	9	11	13	14	16	19	24	29	36	55	78	100							
	3:1 to 10:1	0	4	4	4	4	4	5	6	7	8	9	11	13	14	16	18	21	26	31	38	57	80	100							
	over 10:1	0	4	4	4	5	5	7	9	11	13	15	17	19	21	24	26	29	35	41	48	68	92	100							
1 000	Less than 3:1	0	4	4	4	4	4	4	4	5	5	6	6	7	8	9	10	11	14	16	20	29	41	55	71	89	100				
	3:1 to 10:1	0	4	4	4	4	4	4	5	5	6	7	8	9	10	11	12	13	15	18	22	31	43	57	73	91	100				
	over 10:1	0	4	4	4	4	5	6	7	8	9	11	12	13	15	16	18	20	23	26	30	41	53	68	84	100					
2 000	Less than 3:1	0	4	4	4	4	4	4	4	4	4	5	5	5	6	6	7	7	9	10	12	16	22	29	37	46	56	68	80	94	100
	3:1 to 10:1	0	4	4	4	4	4	4	4	5	5	5	6	6	7	7	8	9	10	12	13	18	24	31	39	49	59	70	83	96	100
	over 10:1	0	4	4	4	4	4	5	5	6	7	8	9	10	11	12	13	14	16	18	20	26	33	41	50	59	70	81	94	100	

Note to Table 3.2.3.1.B.:

[1] Apply whichever is greater,

L = Length of *exposing building face*,

H = Height of *exposing building face*.

Table 3.2.3.1.C.
Unprotected Opening Limits for a Building or Fire Compartment that is Sprinklered

Forming Part of Article 3.2.3.1.

Exposing Building Face	Area of *Unprotected Opening* for Groups A, B, C, D and F, Division 3, *Occupancies*, %										
Maximum Area, m^2	*Limiting Distance*, m										
	0	1.2	1.5	2	2.5	3	4	5	6	7	8	9
10	0	16	24	42	66	100						
15	0	16	20	34	50	74	100					
20	0	16	20	30	42	60	100					
25	0	16	18	26	38	52	90	100				
30	0	14	18	24	34	46	78	100				
40	0	14	16	22	30	40	64	96	100			

Exposing Building Face	Area of *Unprotected Opening* for Groups A, B, C, D and F, Division 3, *Occupancies*, %										
Maximum Area, m^2	*Limiting Distance*, m										
50	0	14	16	20	28	36	56	82	100			
60	0	14	16	20	26	32	50	72	98	100		
80	0	14	16	18	22	28	42	58	80	100		
100	0	14	16	18	22	26	36	50	68	88	100	
150 or more	0	14	14	16	20	22	30	40	52	66	82	100

Table 3.2.3.1.D.
Unprotected Opening Limits for a Building or Fire Compartment that is Sprinklered

Forming Part of Article 3.2.3.1.

Exposing Building Face	Area of *Unprotected Opening* for Groups E and F, Division 1 and 2, *Occupancies*, %																
Maximum Area, m^2	*Limiting Distance*, m																
	0	1.2	1.5	2	2.5	3	4	5	6	7	8	9	10	11	12	13	14	15
10	0	8	12	20	34	50	96	100										
15	0	8	10	16	26	36	68	100										
20	0	8	10	14	22	30	54	86	100									
25	0	8	10	14	18	26	44	70	100									
30	0	8	8	12	18	24	40	60	88	100								
40	0	8	8	12	16	20	32	48	68	94	100							
50	0	8	8	10	14	18	28	40	58	76	100							
60	0	8	8	10	12	16	24	36	50	66	86	100						
80	0	8	8	10	12	14	20	30	40	52	66	84	100					
100	0	8	8	8	10	12	18	26	34	44	56	70	84	100				
150	0	8	8	8	10	12	16	20	26	32	40	50	60	72	84	98	100	
200 or more	0	8	8	8	8	10	14	18	22	28	34	42	50	60	68	80	92	100

(8) The required *limiting distance* for an *exposing building face* is permitted to be measured to a point beyond the property line that is not the centre line of a *street*, lane or public thoroughfare if,

(a) the owners of the properties on which the *limiting distance* is measured and the *municipality* enter into an agreement in which such owners agree that,

(i) each owner covenants that, for the benefit of land owned by the other covenantors, the owner will not *construct* a *building* on his or her property unless the *limiting distance* for *exposing building faces* in respect of the proposed *construction* is measured in accordance with the agreement,

(ii) the covenants contained in the agreement are intended to run with the lands, and the agreement shall be binding on the parties and their respective heirs, executors, administrators, successors and assigns,

(iii) the agreement shall not be amended or deleted from title without the consent of the *municipality*, and

(iv) they will comply with such other conditions as the *municipality* considers necessary, including indemnification of the *municipality* by the other parties, and

(b) the agreement referred to in Clause (a) is registered against the title of the properties to which it applies.

(9) Where an agreement referred to in Sentence (8) is registered against the title of a property, the *limiting distance* for *exposing building faces* shall be measured to the point referred to in the agreement.

3.2.3.2. Area of Exposing Building Face

(1) Except as permitted by Sentences (2), and (3), the area of an *exposing building face* shall be calculated as the total area of exterior wall facing in one direction on any side of a *building* measured from the finished ground level to the uppermost ceiling.

(2) If a *building* is divided by *fire separations* into *fire compartments*, the area of *exposing building face* is permitted to be calculated for each *fire compartment* provided the *fire separations* have a *fire-resistance rating* not less than 45 min.

(3) In a *building* that contains an *interconnected floor space*, the area of the *exposing building face* for the *interconnected floor space* is permitted to be determined by considering each *storey* as a separate *fire compartment* notwithstanding openings through the floor assemblies.

3.2.3.3. Wall Enclosing Attic or Roof Space

(1) An exterior wall enclosing an *attic or roof space* and located above an *exposing building face*, shall be constructed in conformance with the requirements for the *exposing building face*.

3.2.3.4. Reserved

3.2.3.5. Wall with Limiting Distance Less Than 1.2 m

(1) Openings in a wall that has a *limiting distance* less than 1.2 m shall be protected by *closures* whose *fire-protection rating* is in conformance with the *fire-resistance rating* required for the wall.

(2) Wired glass or glass block shall not be used for a *closure* referred to in Sentence (1).

3.2.3.6. Combustible Projections

(1) Except for a *building* containing one or 2 *dwelling units* only, *combustible* projections on the exterior of a wall that could expose an adjacent *building* to fire spread and are more than 1 000 mm above ground level, including balconies, platforms, *canopies*, eave projections and stairs, shall not be permitted within,

(a) 1 200 mm of a property line or the centreline of a *public way*, or

(b) 2 400 mm of a *combustible* projection on another *building* on the same property.

3.2.3.7. Construction of Exposing Building Face

(1) Except as permitted by Articles 3.2.3.10. and 3.2.3.11, if a *limiting distance* shown in Table 3.2.3.1.A. or Table 3.2.3.1.C. for a Group A, B, C, D or Group F, Division 3 *occupancy* classification permits an *exposing building face* to have *unprotected openings* not more than 10% of the *exposing building face*, the *exposing building face* shall be,

(a) of *noncombustible construction* having a *fire-resistance rating* not less than 1 h, and

(b) clad with *noncombustible* cladding.

(2) Except as permitted by Sentence (7) and Articles 3.2.3.10. and 3.2.3.11., if a *limiting distance* shown in Table 3.2.3.1.A. or Table 3.2.3.1.C. for a Group A, B, C, D or Group F, Division 3 *occupancy* classification permits an *exposing building face* to have *unprotected openings* more than 10% but not more than 25% of the *exposing building face*, the *exposing building face* shall,

(a) have a *fire-resistance rating* not less than 1 h, and

(b) be clad with *noncombustible* cladding.

(3) Except as permitted by Articles 3.2.3.10. and 3.2.3.11., if a *limiting distance* shown in Table 3.2.3.1.A. or Table 3.2.3.1.C. for a Group A, B, C, D or Group F, Division 3 *occupancy* classification permits an *exposing building face* to have *unprotected openings* more than 25% but less than 100% of the *exposing building face*, the *exposing building face* shall have a *fire-resistance rating* not less than 45 min.

(4) Except as permitted by Article 3.2.3.10., if a *limiting distance* shown in Table 3.2.3.1.B. or Table 3.2.3.1.D. for a Group E, or Group F, Division 1 or 2 *occupancy* classification permits an *exposing building face* to have *unprotected openings* not more than 10% of the *exposing building face, the exposing building face* shall be,

(a) of *noncombustible construction* having a *fire-resistance rating* not less than 2 h, and

(b) clad with *noncombustible* cladding.

(5) Except as permitted by Sentence (7) and Article 3.2.3.10., if a *limiting distance* shown in Table 3.2.3.1.B. or Table 3.2.3.1.D. for a Group E, or Group F, Division 1 or 2 *occupancy* classification permits an *exposing building face* to have *unprotected openings* more than 10% but not more than 25% of the *exposing building face*, the *exposing building face* shall,

(a) have a *fire-resistance rating* not less than 2 h, and

(b) be clad with *noncombustible* cladding.

(6) Except as permitted by Article 3.2.3.10., if a *limiting distance* shown in Table 3.2.3.1.B. or Table 3.2.3.1.D. for a Group E, or Group F, Division 1 or 2 *occupancy* classification permits an *exposing building face* to have *unprotected openings* more than 25% but less than 100% of the *exposing building face*, the *exposing building face* shall have a *fire-resistance rating* not less than 1 h.

(7) The requirements of Clauses (2)(b) and (5)(b) are waived for a wall assembly that complies with the requirements of Article 3.1.5.5.

(8) The construction requirements for the *exposing building face* that are required by Sentences (1) to (6) shall be satisfied before applying the increased opening area permitted by Sentence 3.2.3.12.(1).

3.2.3.8. Protection of Exterior Building Face

(1) Except as permitted by Sentence (3) and in addition to the requirements of Sentences 3.2.3.7.(2), (3), (5) and (6), foamed plastic insulation used in an exterior wall of a *building* more than 3 *storeys* in *building height* shall be protected on its exterior surface by,

(a) concrete or masonry not less than 25 mm thick, or

(b) *noncombustible* material that complies with the criteria for testing and conditions of acceptance of Sentence (2) when tested in conformance with CAN/ULC-S101-M, "Fire Endurance Tests of Building Construction and Materials".

(2) The criteria for testing and the conditions of acceptance for a wall assembly to satisfy the requirements of Clause (1)(b) are that,

(a) the fire exposed area of the wall assembly shall be not less than 9.3 m^2 and have no dimension less than 2 750 mm,

(b) the exposed surface will include typical vertical and horizontal joints,

(c) the test shall be continued for not less than 15 min and the standard time/temperature curve of the referenced standard shall be followed,

(d) the *noncombustible* protective material will remain in place and no through openings will develop that are visible when viewed normal to the face of the material, and

(e) the *noncombustible* protective material will not disintegrate in a manner that would permit fire to propagate along the surface of the test assembly.

(3) The requirements of Sentence (1) are waived for wall assemblies that comply with the requirements of Article 3.1.5.5.

3.2.3.9. Protection of Structural Members

(1) Structural members, including beams, columns and arches, placed wholly or partly outside an exterior face of a *building* that are less than 3 m from the property line or centreline of a public thoroughfare shall be protected from exterior fire by fire protection having a *fire-resistance rating* not less than that required by Articles 3.2.2.20. to 3.2.2.83. for their protection from interior fires, but not less than 1 h.

(2) Structural members of *heavy timber construction*, including beams, columns and arches, placed wholly or partly outside an exterior face of a *building* and 3 m or more from the property line or centreline of a public thoroughfare need not be covered with *noncombustible* cladding.

3.2.3.10. Unlimited Unprotected Openings

(1) An *exposing building face* of an *open-air storey* in a *storage garage* is permitted to have unlimited *unprotected openings* provided it has a *limiting distance* not less than 3 m.

(2) The *exposing building face* of a *storey* that faces a *street* and is at the same level as the *street* is permitted to have unlimited *unprotected openings* if the *limiting distance* is not less than 9 m.

3.2.3.11. Low Fire Load, One Storey Building

(1) An *exposing building face* of a *building* of *low hazard industrial occupancy* conforming to Article 3.2.2.82. is permitted to be of *noncombustible construction* without a *fire-resistance rating* provided,

(a) it is not a *loadbearing* wall, and

(b) the *limiting distance* is not less than 3 m.

3.2.3.12. Area Increase for Unprotected Openings

(1) Except as required by Sentence 3.2.3.7.(8), the maximum area of *unprotected openings* in any *exposing building face* or *fire compartment* of a *building* that is not *sprinklered* is permitted to be doubled if the openings are glazed with,

(a) glass block conforming to the requirements of Article 3.1.8.14., or

(b) wired glass assemblies conforming to Supplementary Standard SB-2.

3.2.3.13. Protection of Exit Facilities

(1) Except as required by Sentence (3) and as permitted by Sentence 3.4.4.3.(1), if the plane of an exterior wall of an *exit* enclosure forms an angle less than 135° with the plane of an exterior wall of the *building* it serves, and an opening in the exterior wall of the *exit* enclosure could be exposed to fire from an opening in the exterior wall of the *building*, the opening in either the exterior wall of the *exit* or the exterior wall of the *building* shall be protected in conformance with the requirements of Sentence (4) where the opening in the exterior wall of the *building* is within 3 m horizontally and,

(a) less than 10 m below an opening in the exterior wall of the *exit*, or

(b) less than 2 m above an opening in the exterior wall of the *exit*.

(2) If an unenclosed exterior *exit* stair or ramp could be exposed to fire from an opening in the exterior wall of the *building* it serves, the opening in the exterior wall of the *building* shall be protected in conformance with the requirements of Sentence (4) where the opening in the exterior wall of the *building* is within 3 m horizontally and,

(a) less than 10 m below the *exit* stair or ramp, or

(b) less than 5 m above the *exit* stair or ramp.

(3) Except as permitted by Sentence 3.4.4.3.(1), if an exterior *exit* door in one *fire compartment* is within 3 m horizontally of an opening in another *fire compartment* and the exterior walls of these *fire compartments* intersect at an exterior angle of less than 135°, the opening shall be protected in conformance with the requirements of Sentence (4).

(4) The opening protection referred to in Sentences (1) to (3) shall consist of,

(a) glass block conforming to the requirements of Article 3.1.8.14.,

(b) a wired glass assembly conforming to Supplementary Standard SB-2, or

(c) a *closure* conforming to the requirements of Subsection 3.1.8. and Articles 3.2.3.1. and 3.2.3.14.

3.2.3.14. Wall Exposed to Another Wall

(1) Except as required by Sentences (3) and 3.2.3.13.(1) or as permitted by Sentence 3.2.3.19.(4), if an *unprotected opening* in an exterior wall of a *fire compartment* is exposed to an *unprotected opening* in the exterior wall of another *fire compartment*, and the planes of the 2 walls are parallel or at an angle less than 135°, measured from the exterior of the *building*, the *unprotected openings* in the 2 *fire compartments* shall be separated by a distance not less than D_O.

where,

D_O = $2D - [(\theta/90) \times D]$ but in no case less than 1 000 mm, and

D = the greater required *limiting distance* for the *exposing building faces* of the 2 *fire compartments*, and

θ = the angle made by the intersecting planes of the *exposing building faces* of the 2 *fire compartments* (in the case where the exterior walls are parallel and face each other, $\theta = 0°$).

(2) The exterior wall of each *fire compartment* referred to in Sentence (1) within the distance, D_O, shall have a *fire-resistance rating* not less than that required for the interior vertical *fire separation* between the *fire compartment* and the remainder of the *building*.

(3) Sentence (1) does not apply to *unprotected openings* of *fire compartments* within a *building* that is *sprinklered*, but shall apply to,

(a) *unprotected openings* of *fire compartments* on opposite sides of a *firewall*, and

(b) exposure from *unprotected openings* of a *fire compartment* that is not protected by an automatic sprinkler system.

3.2.3.15. Wall Exposed to Adjoining Roof

(1) Except as permitted by Sentence 3.2.3.19.(4), if a wall in a *building* is exposed to a fire hazard from an adjoining roof of a separate *fire compartment* that is not *sprinklered* in the same *building*, and the exposed wall contains windows within 3 *storeys* vertically and 5 m horizontally of the roof, the roof shall contain no skylights within 5 m of the exposed wall.

3.2.3.16. Protection of Soffits

(1) Except as permitted by Sentences (2) and (3), where a common *attic or roof space* spans more than 2 *suites* of *residential occupancy* or more than 2 patients' or residents' sleeping rooms in a Group B, Division 2 or Division 3 *occupancy*, and the common *attic or roof space* projects beyond the exterior wall of the *building*, the portion of any soffit or other surface enclosing the projection that is less than 2 500 mm vertically above a window or door and less than 1 200 mm from either side of the window or door, shall have no openings and shall be protected by,

(a) *noncombustible material*,

  (i) not less than 0.38 mm thick, and

  (ii) having a melting point not below 650°C,

(b) not less than 12.7 mm thick gypsum soffit board or gypsum wallboard installed according to CSA A82.31-M, "Gypsum Board Application",

(c) not less than 11 mm thick plywood,

(d) not less than 12.5 mm thick OSB or waferboard, or

(e) not less than 11 mm thick lumber.

(2) Where an *attic or roof space*, including its adjoining eave overhangs, is separated by construction conforming to Article 3.1.11.7. into compartments such that the resulting spaces are not common to more than 2 *suites* of *residential occupancy* or more than 2 patients' or residents' sleeping rooms in a Group B, Division 2 or Division 3 *occupancy*, the requirements in Sentence (1) do not apply.

(3) If an eave overhang is completely separated from the remainder of the *attic or roof space* by fire stopping, the requirements of Sentence (1) do not apply.

(4) The protection required by Sentence (1) for projections is permitted to be omitted if,

(a) the *fire compartments* behind the window and door openings are *sprinklered* in accordance with Article 3.2.5.13., and

(b) all rooms, including closets and bathrooms, having openings in the wall beneath the soffit are *sprinklered*, notwithstanding exceptions permitted in the standards referenced in Article 3.2.5.13. for the installation of automatic sprinkler systems.

3.2.3.17. Canopy Protection for Vertically Separated Openings

(1) Except as permitted by Sentences (2) and (3), if a *storey* classified as a Group E or Group F, Division 1 or 2 *major occupancy* is required to be separated from the *storey* above by a *fire separation*,

(a) every opening in the exterior wall of the lower *storey* that is located vertically below an opening in the *storey* above shall be separated from the *storey* above by a *canopy* projecting not less than 1 000 mm from the face of the *building* at the intervening floor level, and

(b) the *canopy* required by Clause (a) shall have a *fire-resistance rating* not less than that required for the floor assembly but need not be more than 1 h, except as required elsewhere in this Subsection.

(2) Except as permitted by Sentence (3), the *canopy* required by Sentence (1) is permitted to be omitted if the exterior wall of the upper *storey* is recessed not less than 1 000 mm behind the exterior wall containing the opening in the lower *storey*.

(3) The requirements of Sentences (1) and (2) are permitted to be waived if sprinklers are installed in,

(a) the lower *storey* referred to in Clause (1)(a), and

(b) the *storey* immediately above the lower *storey*.

3.2.3.18. Covered Vehicular Passageway

(1) A covered vehicular passageway designed as a receiving or shipping area shall be separated from every *building* or part of a *building* adjoining it by a *fire separation* having a *fire-resistance rating* not less than 1.5 h.

(2) A covered vehicular passageway constructed below *grade* shall be of *noncombustible construction*.

3.2.3.19. Walkway between Buildings

(1) Except as required by Sentence 3.2.3.20.(2), if *buildings* are connected by a *walkway*, each *building* shall be separated from the *walkway* by a *fire separation* with a *fire-resistance rating* not less than 45 min.

(2) Except as permitted by Sentence (3), a *walkway* connected to a *building* required to be of *noncombustible construction* shall also be of *noncombustible construction*.

(3) A *walkway* connected to a *building* required to be of *noncombustible construction* is permitted to be of *heavy timber construction* provided,

(a) not less than 50% of the area of any enclosing perimeter walls is open to the outdoors, and

(b) the *walkway* is at ground level.

(4) A *walkway* of *noncombustible construction* used only as a pedestrian thoroughfare need not conform to the requirements of Articles 3.2.3.14. and 3.2.3.15.

(5) A *walkway* between *buildings* shall be not more than 9 m wide.

3.2.3.20. Underground Walkway

(1) An underground *walkway* shall not be designed or used for any purpose other than pedestrian travel unless,

(a) the purpose is permitted, and

(b) sprinklers are installed in any space in the *walkway* containing an *occupancy*.

(2) *Buildings* connected by an underground *walkway* shall be separated from the *walkway* by a *fire separation* with a *fire-resistance rating* not less than 1 h.

(3) An underground *walkway* shall be of *noncombustible construction* suitable for an underground location.

(4) In an underground *walkway*,

(a) smoke barrier doors shall be installed at intervals of not more than 100 m, or

(b) the travel distance from the door of an adjacent room or space to the nearest *exit* shall be not more than one and a half times the least allowable travel distance to an *exit* for any of the adjacent *occupancies* as permitted by Sentence 3.4.2.5.(1).

(5) An underground *walkway* between *buildings* shall be not more than 9 m wide.

3.2.4. Fire Alarm and Detection Systems

3.2.4.1. Determination of Requirement for a Fire Alarm System

(1) Reserved

(2) Except as permitted by Sentences (3) to (5) and Sentence 3.2.4.2.(4), a fire alarm system shall be installed in a *building* that contains,

(a) a *contained use area*,

(b) an *impeded egress zone*,

(c) more than 3 *storeys*, including *storeys* below the *first storey*,

(d) a total *occupant load* more than 300, other than in open air seating areas,

(e) an *occupant load* more than 150 above or below the *first storey*, other than in open air seating areas,

(f) a school, college, or child care facility, with an *occupant load* more than 40,

(g) a licensed beverage establishment or a restaurant, with an *occupant load* more than 150,

(h) a *medium hazard industrial occupancy* or a *low hazard industrial occupancy* with an *occupant load* more than 75 above or below the *first storey*,

(i) a *residential occupancy* with sleeping accommodation for more than 10 persons,

(j) a *high hazard industrial occupancy* with an *occupant load* more than 25,

(k) an *occupant load* more than 300 below an open air seating area,

(l) an *interconnected floor space* required to conform to Articles 3.2.8.3. to 3.2.8.11,

(m) a *care and treatment occupancy* for more than 10 persons receiving care or treatment, or

(n) a *care occupancy* for more than 10 persons receiving care.

(3) If each *dwelling unit* has direct access to an exterior *exit* facility leading to ground level, a fire alarm system is not required in an apartment *building*,

(a) in which not more than 4 *dwelling units* share a common *means of egress*, or

(b) that is not more than 3 *storeys* in *building height*.

(4) A fire alarm system is not required in a *hotel* 3 *storeys* or less in *building height* provided each *suite* has direct access to an exterior *exit* facility leading to ground level.

(5) A fire alarm system is not required in a *storage garage* conforming to Article 3.2.2.83. provided there are no other *occupancies* in the *building*.

3.2.4.2. Continuity of Fire Alarm System

(1) If there are openings through a *firewall*, other than those for piping, tubing, wiring and totally enclosed *noncombustible* raceways, the requirements in this Subsection shall apply to the *floor areas* on both sides of the *firewall* as if they were in the same *building*.

(2) Except as permitted by Sentence (4), if a *building* contains more than one *major occupancy* and a fire alarm system is required, a single system shall serve all *occupancies*.

(3) Except as permitted by Sentence (4), if a fire alarm system is required in any portion of a *building*, it shall be installed throughout the *building*.

(4) Except as required by Sentence (5), the requirements in this Subsection are permitted to be applied to each portion of a *building* not more than 3 *storeys* in *building height*, in which a vertical *fire separation* having a *fire-resistance rating* not less than 1 h separates the portion from the remainder of the *building* as if it were a separate *building*, provided there are no openings through the *fire separation*, other than those for piping, tubing, wiring and totally enclosed *noncombustible* raceways.

(5) The permission in Sentence (4) to consider separated portions of a *building* as separate *buildings* does not apply to *service rooms* and storage rooms.

3.2.4.3. Types of Fire Alarm Systems

(1) A fire alarm system shall be,

(a) a single stage system in a Group F, Division 1 *occupancy*,

(b) a 2 stage system in a Group B *occupancy* other than those described in Clause (c),

(c) a single or 2 stage system in a *building* 3 *storeys* or less in *building height* that contains a Group B, Division 3 *occupancy*,

(d) a single stage system in elementary and secondary schools, except for a special needs facility, and

(e) a single or 2 stage system in all other cases.

3.2.4.4. Description of Fire Alarm Systems

(1) A single stage fire alarm system shall, upon the operation of any manual pull station or *fire detector*, cause an *alarm signal* to sound on all audible signal devices in the system.

(2) A 2 stage fire alarm system shall,

(a) cause an *alert signal* to sound upon the operation of any manual pull station or *fire detector*,

(b) except for a Group B, Division 2 *occupancy*, automatically cause an *alarm signal* to sound if the *alert signal* is not acknowledged within 5 min of its initiation,

(c) have each manual pull station equipped so that the use of a key or other similar device causes an *alarm signal* to sound and continue to sound upon the removal of the key or similar device from the manual pull station, and

(d) in a *building* containing a *hotel*,

  (i) cause an *alarm signal* to sound in the initiating fire zone in the *hotel*, and

  (ii) cause an *alert signal* to sound throughout the *hotel* and such parts of the *building* as is necessary to alert *hotel* staff.

(3) A 2 stage fire alarm system is permitted to be zone coded so that, upon the operation of any manual pull station or *fire detector*,

(a) a coded *alert signal* is sounded indicating the zone of alarm initiation,

(b) the coded *alert signal* is repeated in its entirety no fewer than 4 times, and

(c) a continuous *alert signal* is sounded upon completion of the coded signals referred to in Clause (b) and Sentence (4).

(4) If a second manual pull station or *fire detector* is operated in a fire alarm system with zone coding as permitted by Sentence (3), in a zone other than that for which the first *alert signal* was sounded, the coded *alert signal* for the first zone shall be completed before the coded *alert signal* for the second zone is repeated no fewer than 4 times.

3.2.4.5. Installation and Verification of Fire Alarm Systems

(1) Fire alarm systems, including those with voice communication capability, shall be installed in conformance with CAN/ULC-S524, "Installation of Fire Alarm Systems".

(2) A fire alarm system shall be verified in conformance with CAN/ULC-S537, "Verification of Fire Alarm Systems", to ensure satisfactory operation.

3.2.4.6. Silencing of Alarm Signals

(1) Except as permitted by Sentence (3), a fire alarm system shall be designed so that when an *alarm signal* is actuated, it cannot be silenced automatically before a period of time has elapsed that is not less than,

(a) 5 min for a *building* not required to be equipped with an annunciator, and

(b) 20 min for any other *building*.

(2) Except as permitted by Sentences 3.2.4.19.(9), and 3.2.4.22.(2) and (3), a fire alarm system shall not incorporate manual silencing switches other than those installed inside the fire alarm control unit.

(3) Except as provided in Clause 3.2.4.22.(3)(a), in a *care and treatment occupancy* an *alert signal* is permitted to be silenced automatically after 1 min.

3.2.4.7. Signals to Fire Department

(1) If a fire alarm system is required to be installed and a single stage system is provided, the system shall be designed to notify the fire department in conformance with Sentence (4) that an *alarm signal* has been initiated in,

(a) a Group A *occupancy* having an *occupant load* more than 300,

(b) a Group B *occupancy*,

(c) a Group F, Division 1 *occupancy*,

(d) a *building* regulated by the provisions of Subsection 3.2.6., or

(e) a *building* containing *interconnected floor space* required to conform to Articles 3.2.8.3. to 3.2.8.11.

(2) A fire alarm system that includes waterflow indicating devices shall be designed to notify the fire department, in conformance with Sentence (4), that an alarm has been initiated.

(3) If a fire alarm system is required to be installed and a 2 stage system is provided, the system shall be designed to notify the fire department, in conformance with Sentence (4), that an *alert signal* has been initiated.

(4) Notification of the fire department required by Sentences (1) to (3) shall be by way of,

(a) signals to a central station conforming to CAN/ULC-S561, "Installation and Services for Fire Signal Receiving Centres and Systems", or

(b) the municipal fire alarm system.

(5) Where a single stage fire alarm system is installed in a *building* that is not *sprinklered*, and Sentence (1) does not apply, a legible notice, that is not easily removed, shall be affixed to the wall near each manual pull station stating,

(a) that the fire department is to be notified in the event of a fire emergency, and

(b) the emergency telephone number for the *municipality* or the telephone number of the fire department.

3.2.4.8. Annunciator and Zone Indication

(1) Except as permitted in Sentences (3) to (5), an annunciator shall be installed in close proximity to a *building* entrance that faces a *street* or an access route for fire department vehicles that complies with Sentence 3.2.5.5.(1).

(2) Except as permitted by Sentence (6), the annunciator required by Sentence (1) shall have separate zone indication of the actuation of the alarm initiating devices in each,

(a) *floor area* so that in a *building* that is not *sprinklered*, the area of coverage for each zone is neither more than,

  (i) one *storey*, nor

  (ii) 2 000 m^2,

(b) *floor area* so that in a *building* that is *sprinklered*, the area of coverage for each zone is neither more than,

  (i) one *storey*, nor

  (ii) the system area limits as specified in NFPA 13, "Installation of Sprinkler Systems",

(c) shaft required to be equipped with *smoke detectors*,

(d) air handling system required to be equipped with *smoke detectors*,

(e) *contained use area*,

(f) *impeded egress zone*,

(g) *fire compartment* required in Sentence 3.3.3.5.(2), and

(h) *fire compartment* required to be separated by vertical *fire separations* having a *fire-resistance rating* not less than 2 h, other than *dwelling units* described in Subsection 3.3.4.

(3) An annunciator need not be provided for a fire alarm system if not more than one zone indicator is required in Sentence (2).

(4) If an annunciator is not installed as part of a fire alarm system in conformance with Sentence (1), a visual and audible trouble signal device shall be provided inside the main entrance of the *building*.

(5) The requirements in Sentence (1) are waived in a *building*,

(a) Reserved

(b) that has an aggregate area for all *storeys* of not more than 2 000 m^2, and

(c) that is not more than 3 *storeys* in *building height*.

(6) The area limits of Clause (2)(a) are waived for an interior undivided open space used as an arena, a rink or a swimming pool provided that other spaces in the *building* that are separated from the open space are individually zoned in accordance with the requirements of Sentence (2).

(7) A fire alarm control unit installed in close proximity to a *building* entrance that faces a *street* or an access route for fire department vehicles that complies with Sentence 3.2.5.5.(1), is deemed to satisfy the requirement for an annunciator provided all indicators required for an annunciator or trouble signal device are included on the control unit.

(8) In a *building* containing a *hotel* in which a trouble signal sounding device has a silencing switch, a trouble light shall be installed in,

(a) the main reception area serving the *hotel*, or

(b) another continually-supervised location.

(9) In a nursing home, a remote audiovisual fire alarm trouble signal shall be located at the main nursing station.

3.2.4.9. Electrical Supervision

(1) Electrical supervision shall be provided for a fire alarm system.

(2) If a fire alarm system is installed in a *building*, an automatic sprinkler system shall be electrically supervised to indicate a supervisory signal on the *building* fire alarm system annunciator for each of the following:

(a) movement of a valve handle that controls the supply of water to sprinklers;

(b) loss of excess water pressure required to prevent false alarms in a wet pipe system;

(c) loss of air pressure in a dry pipe system;

(d) loss of air pressure in a pressure tank;

(e) a significant change in water level in any water storage container used for fire fighting purposes;

(f) loss of power to any automatically starting fire pump, and

(g) a temperature approaching the freezing point in any dry pipe valve enclosure or water storage container used for fire fighting purposes.

3.2.4.10. Fire Detectors

(1) *Fire detectors* required by this Article shall be connected to the fire alarm system.

(2) Except as provided in Article 3.2.4.15., if a fire alarm system is required, *fire detectors* shall be installed in,

(a) storage rooms not within *dwelling units*,

(b) *service rooms* not within *dwelling units*,

(c) janitors' rooms,

(d) rooms in which hazardous substances are to be used or stored,

(e) elevator and dumbwaiter shafts,

(f) a laundry room in a *building* of *residential occupancy*, but not one within a *dwelling unit*, and

(g) *hazardous classrooms* and change rooms in elementary and secondary schools.

3.2.4.11. Smoke and Heat Detectors

(1) If a fire alarm system is required, *smoke detectors* shall be installed in,

(a) each sleeping room and each corridor serving as part of a *means of egress* from sleeping rooms in portions of a *building* classified as Group B *major occupancy*,

(b) each room in a *contained use area* and corridors serving those rooms,

(c) each corridor in portions of a *building* classified as Group A, Division 1 *major occupancy*,

(d) each *public corridor* in portions of a *building* classified as Group C *major occupancy*,

(e) each *exit* stair shaft, and

(f) Reserved

(g) each corridor serving classrooms in elementary and secondary schools.

(2) Except as provided in Article 3.2.4.15, if a fire alarm system is required, *heat detectors* shall be installed in,

(a) every room in portions of *buildings* classified as Group A, Division 1,

(b) except in a *hotel*, in every *suite*, and every room not located within a *suite*, in portions of *buildings* classified as Group C *major occupancy* and more than 3 *storeys* in *building height*, and

(c) in a *floor area* containing a *hotel*, in every room in a *suite* and in every room not located in a *suite* other than washrooms within a *suite*, saunas, refrigerated areas and swimming pools.

(3) *Smoke detectors* required in sleeping rooms of *care or detention occupancy* shall upon actuation provide an audible and visible signal to staff serving those rooms so that the room or location containing the *smoke detector* can be easily identified.

3.2.4.12. Prevention of Smoke Circulation

(1) If a fire alarm system is installed, an air handling system shall be designed to prevent the circulation of smoke upon a signal from a duct-type *smoke detector* if the air handling system,

(a) serves more than one *storey*,

(b) serves more than one *suite* in a *storey*,

(c) serves more than one *fire compartment* required by Sentence 3.3.3.5.(2) or

(d) is not provided with *fire-dampers* as permitted by Sentence 3.1.8.8.(8)

3.2.4.13. Vacuum Cleaning System Shutdown

(1) A central vacuum cleaning system in a *building* equipped with a fire alarm system shall be designed to shut down upon actuation of the fire alarm system.

3.2.4.14. Elevator Emergency Return

(1) Except as permitted by Sentence (3), in a *building* having elevators that serve *storeys* above the *first storey* and that are equipped with an automatic emergency recall feature, *smoke detectors* shall be installed in the elevator lobbies on the recall level so that when these *smoke detectors* are actuated, the elevators will automatically return directly to an alternate floor level.

(2) *Smoke detectors* required by Sentence (1) shall be designed as part of the *building* fire alarm system.

(3) The alternate floor recall feature required by Sentence (1) is not required if the *floor area* containing the recall level is *sprinklered*.

3.2.4.15. Sprinklers in Lieu of Fire Detectors

(1) *Fire detectors* required by Article 3.2.4.10. and *heat detectors* required by Sentence 3.2.4.11.(2) need not be provided within a *floor area* if the *floor area* is *sprinklered* and the sprinkler system is electrically supervised in conformance with Sentence 3.2.4.9.(2).

3.2.4.16. System Monitoring

(1) An automatic sprinkler system shall be equipped with waterflow detecting devices and, if an annunciator is required by Article 3.2.4.8., shall be installed so that each device serves,

(a) not more than one *storey*, and

(b) an area on each *storey* that is not more than the system area limits as specified in NFPA 13, "Installation of Sprinkler Systems".

(2) If a fire alarm system is provided, waterflow indicating devices required by Sentence (1) shall be connected to the fire alarm system so that on actuation an *alert signal* or an *alarm signal* is initiated.

3.2.4.17. Manual Pull Stations

(1) Except as permitted by Sentences (2) and (3), if a fire alarm system is installed, a manual pull station shall be installed,

(a) near the principal entrance to the *building*, and

(b) near every required *exit*.

(2) In a *building* that is *sprinklered*, a manual pull station is not required at an exterior egress doorway from a *suite* that does not lead to an interior shared *means of egress* in a *hotel* not more than 3 *storeys* in *building height*, provided each *suite* is served by an exterior *exit* facility leading directly to ground level.

(3) In a *building* that is *sprinklered*, a manual pull station is not required at an exterior egress doorway from a *dwelling unit* that does not lead to an interior shared *means of egress* in a *building* not more than 3 *storeys* in *building height* containing only *dwelling units*, provided each *dwelling unit* is served by an exterior *exit* facility leading directly to ground level.

(4) In a *building* referred to in Sentences (2) or (3), manual pull stations shall be installed near doorways leading from shared interior corridors to the exterior.

(5) In a *building* containing a *hotel*, a manual pull station shall be installed in the main reception area serving the *hotel*.

(6) Except as permitted by Sentence (3), in Group C apartment *buildings*, if a pull station is not installed on a *floor area* in accordance with Sentences (1) or (4),

(a) a manual pull station shall be installed in every *dwelling unit* in the *floor area* near each egress door leading from the *dwelling unit*,

(b) *smoke detectors* shall be installed in the *floor area* in *public corridors* and stairwells, and

(c) *fire detectors* shall be installed in the *floor area* in all common public areas and in rooms not located within *dwelling units*.

(7) In *floor areas* where the manual pull stations are located in *dwelling units*, a legible sign stating **FIRE ALARM PULL STATIONS LOCATED IN APARTMENT UNITS** shall be posted near every *exit* in a *public corridor*.

(8) Key switch activated pull stations are permitted in an *impeded egress zone* and a *contained use area* in Group B, Division 1 and Division 2 *occupancies*.

3.2.4.18. Alert and Alarm Signals

(1) In a 2 stage fire alarm system described in Sentence 3.2.4.4.(2), the same audible signal devices are permitted to be used to sound the *alert signals* and the *alarm signals*.

(2) If audible signal devices with voice reproduction capabilities are intended for paging and similar voice message use, other than during a fire emergency, they shall be installed so that *alert signals* and *alarm signals* take priority over all other signals.

(3) Audible signal devices forming part of a fire alarm or voice communication system shall not be used for playing music or background noise.

(4) Except as permitted in Sentence (6), visual signal devices shall be installed in addition to audible signal devices,

(a) in a *building* or portion of it intended for use primarily by persons with hearing impairment,

(b) in a *public corridor* serving a Group A, B, D or E *occupancy*,

(c) in a corridor used by the public and in a *floor area* or part of it where the public may congregate in Group A *occupancy*, and

(d) in not less than 10% of the *suites* of a *hotel* or motel.

(5) Visual signal devices are permitted to be installed in lieu of audible signal devices in the compartments referred to in Article 3.3.3.6.

(6) Visual signal devices required by Clauses (4)(b) and (c) are not required in,

(a) a classroom, and

(b) a Group B, Division 3 *occupancy* that contains sleeping accommodation for not more than 10 persons and not more than 6 occupants require assistance in evacuation in case of an emergency.

3.2.4.19. Audibility of Alarm Systems

(1) Except as permitted in Sentence 3.2.4.18.(5), audible signal devices forming part of a fire alarm system shall be installed in a *building* so that *alert signals* and *alarm signals* are clearly audible throughout the *floor area* in which they are installed.

(2) The sound pattern of an *alarm signal* shall conform to the temporal pattern defined in Clause 4.2 of International Standard ISO 8201, "Acoustics — Audible Emergency Evacuation Signal".

(3) The sound patterns of *alert signals* shall be significantly different from the temporal patterns of *alarm signals*.

(4) In all normally occupied spaces, the fire *alarm signal* sound pressure level,

(a) shall be not more than 100 dBA when measured at a distance of 3 m from the device, or

(b) is permitted to be more than 100 dBA provided the sound pressure level measured 2 000 mm above floor level is not more than 100 dBA.

(5) The sound pressure level in a sleeping room from a fire alarm audible signal device shall be not less than 75 dBA in a *building* of *residential occupancy* when any intervening doors between the device and the sleeping room are closed.

(6) Except as required by Sentence (5), the sound pressure level from a fire alarm audible signal device in a *floor area* shall be not less than 10 dBA above the ambient noise level, but with a minimum value not less than 65 dBA.

(7) Fire alarm audible signal devices shall be supplemented by visual signal devices in any *floor area* in which,

(a) the ambient noise level is more than 87 dBA, or

(b) the occupants of the *floor area*,

  (i) use ear protective devices,

  (ii) are located within an audiometric booth, or

  (iii) are located within sound insulated enclosures.

(8) Sentence (7) shall also apply in an *assembly occupancy* in which music and other sounds associated with performances could exceed 100 dBA.

(9) Except as permitted by Sentence (13), an audible signal device located within a *dwelling unit* shall incorporate a means that enables the device to be silenced for a period of not more than 10 min, after which the device shall restore to normal operation.

(10) Audible signal devices within a *dwelling unit* or a *suite* of *residential occupancy* shall be connected to the fire alarm system,

(a) in a manner such that a single open circuit at one device will not impair the operation of other audible signal devices on the same circuit that serve the other *dwelling units* or *suites* of *residential occupancy*, or

(b) on separate signal circuits that are not connected to the devices in any other *dwelling unit*, *public corridor*, or *suites* of *residential occupancy*.

(11) In a *building* or part of it classified as a *residential occupancy*,

(a) separate circuits shall be provided for audible signal devices on each *floor area*, and

(b) audible signal devices within *dwelling units* or *suites* of *residential occupancy* shall be wired on separate signal circuits from those not within *suites* of *residential occupancy* or *dwelling units*.

(12) Audible signal devices shall be installed in a *service space* referred to in Sentence 3.2.1.1.(9) and shall be connected to the fire alarm system.

(13) Audible signal devices, within *dwelling units* that are wired on separate signal circuits, need not include a means for silencing as required by Sentence (9) provided the fire alarm system includes a provision for the automatic signal silence within *dwelling units*, where,

(a) the automatic signal silence cannot occur within the first 60 s of operation or within the zone of initiation,

(b) a subsequent alarm elsewhere in the *building* will reactuate the silenced audible signal devices within *dwelling units*,

(c) after a period of not more than 10 min, the silenced audible signal devices will be restored to continuous audible signal if the alarm is not acknowledged, and

(d) the voice communication system referred to in Article 3.2.4.22. has a provision to override the automatic signal to allow the transmission of voice messages through silenced audible signal device circuits that serve the *dwelling units*.

(14) If a 2 stage fire alarm system has been installed with an automatic signal silence as described in Sentence (13), the system shall be designed so that any silenced audible signal devices serving *dwelling units* are reactuated whenever an *alarm signal* is required to be transmitted as part of the second stage.

3.2.4.20. Visual Signals

(1) Visual signal devices required by Sentences 3.2.4.18.(4) and 3.2.4.19.(7) and (8) shall be installed so that the signal from at least one device is visible throughout the *floor area* or portion of it in which they are installed.

(2) Visual signal devices permitted by Sentence 3.2.4.18.(5) shall be installed so that the signal from at least one device is visible throughout the compartment in which they are installed.

3.2.4.21. Smoke Alarms

(1) *Smoke alarms* conforming to CAN/ULC-S531, "Smoke Alarms", shall be installed in each *dwelling unit* and, except for *care or detention occupancies* required to have a fire alarm system, in each sleeping room not within a *dwelling unit*.

(2) At least one *smoke alarm* shall be installed on each *storey* and *mezzanine* of a *dwelling unit*.

(3) On any *storey* of a *dwelling unit* containing sleeping rooms, a *smoke alarm* shall be installed in a location between the sleeping rooms and the remainder of the *storey*, and if the sleeping rooms are served by a hallway, the *smoke alarm* shall be located in the hallway.

(4) A *smoke alarm* shall be installed on or near the ceiling.

(5) A *smoke alarm* shall be installed with permanent connections to an electrical circuit and shall have no disconnect switches between the overcurrent device and the *smoke alarm*.

(6) If more than one *smoke alarm* is required in a *dwelling unit*, the *smoke alarms* shall be wired so that the actuation of one *smoke alarm* will cause all *smoke alarms* within the *dwelling unit* to sound.

(7) A *smoke alarm* required by Sentence (1) shall be installed in conformance with CAN/ULC-S553, "Installation of Smoke Alarms".

(8) A manually operated device is permitted to be incorporated within the circuitry of a *smoke alarm* installed in a *dwelling unit* so that it will silence the signal emitted by the *smoke alarm* for a period of not more than 10 min, after which the *smoke alarm* will reset and again sound the alarm if the level of smoke in the vicinity is sufficient to reactuate the *smoke alarm*.

(9) The sound patterns of *smoke alarms* shall be significantly different from the temporal patterns of *alarm signals*.

3.2.4.22. Voice Communication Systems

(1) A voice communication system required by Subsection 3.2.6. or Clause 3.3.2.4.(14)(f) shall consist of,

(a) a 2-way communication system in each *floor area*, with connections to the central alarm and control facility and to the mechanical control centre, and

(b) loudspeakers operated from the central alarm and control facility that are designed and located so as to be audible and the messages intelligible in all parts of the *building*, except that this requirement does not apply to elevator cars.

(2) The voice communication system referred to in Sentence (1) shall include a means to silence the *alarm signal* in a single stage fire alarm system while voice messages are being transmitted, but only after the *alarm signal* has initially sounded for not less than 30 s.

(3) The voice communication system referred to in Sentence (1) shall include a means to silence the *alert signal* and the *alarm signal* in a 2 stage fire alarm system while voice messages are being transmitted, but only after the *alert signal* has initially sounded for not less than,

(a) 10 s in hospitals that have supervisory personnel on duty for twenty-four hours each day, or

(b) 30 s for all other *occupancies*.

(4) The voice communication system referred to in Clause (1)(b) shall be designed so that the *alarm signal* can be selectively transmitted to any zone or zones while maintaining an *alert signal* or selectively transmitting voice messages to any other zone or zones in the *building*.

(5) The 2-way communication system referred to in Clause (1)(a) shall be installed so that emergency telephones are located in each *floor area* near *exit* stair shafts.

3.2.5. Provisions for Fire Fighting

3.2.5.1. Access to Above Grade Storeys

(1) Except for *storeys* below the *first storey*, direct access for fire fighting shall be provided from the outdoors to every *storey* that is not *sprinklered* and whose floor level is less than 25 m above *grade*, by at least one unobstructed window or access panel for each 15 m of wall in each wall required to face a *street* by Subsection 3.2.2.

(2) An opening for access required by Sentence (1) shall,

(a) have a sill no higher than 1070 mm above the inside floor, and

(b) be not less than 1 100 mm high by not less than,

  (i) 550 mm wide for a *building* not designed for the storage or use of dangerous goods, or

  (ii) 750 mm wide for a *building* designed for the storage or use of dangerous goods.

(3) Access panels above the *first storey* shall be readily openable from both inside and outside, or the opening shall be glazed with plain glass.

3.2.5.2. Access to Basements

(1) Direct access from at least one *street* shall be provided from the outdoors to each *basement*,

(a) that is not *sprinklered*, and

(b) that has horizontal dimension more than 25 m.

(2) The access required by Sentence (1) is permitted to be provided by,

(a) doors, windows or other means that provide an opening not less than 1 100 mm high and 550 mm wide, with a sill no higher than 900 mm above the inside floor, or

(b) an interior stairway immediately accessible from the outdoors.

3.2.5.3. Roof Access

(1) On a *building* more than 3 *storeys* in *building height* where the slope of the roof is less than 1 in 4, all main roof areas shall be provided with direct access from the *floor areas* immediately below, either by,

(a) a stairway, or

(b) a hatch not less than 550 mm by 900 mm with a fixed ladder.

(2) Clearance and access around roof signs or other obstructions shall provide,

(a) a passage not less than 900 mm wide by 1 800 mm high, clear of all obstructions except for necessary horizontal supports not more than 600 mm above the roof surface,

  (i) around every roof sign, and

  (ii) through every roof sign at locations not more than 15 m apart, and

(b) a clearance of not less than 1 200 mm between any portion of a roof sign and any opening in the exterior wall face or roof of the *building* in which it is erected.

3.2.5.4. Access Routes

(1) A *building* that is more than 3 *storeys* in *building height* or more than 600 m^2 in *building area* shall be provided with access routes for fire department vehicles,

(a) to the *building* face having a principal entrance, and

(b) to each *building* face having access openings for fire fighting as required by Articles 3.2.5.1. and 3.2.5.2.

3.2.5.5. Location of Access Routes

(1) Access routes required by Article 3.2.5.4. shall be located so that the principal entrance and every access opening required by Articles 3.2.5.1. and 3.2.5.2. are located not less than 3 m and not more than 15 m from the closest portion of the access route required for fire department use, measured horizontally from the face of the *building*.

(2) Access routes shall be provided to a *building* so that,

(a) for a *building* provided with a fire department connection, a fire department pumper vehicle can be located adjacent to the hydrants referred to in Article 3.2.5.16.,

(b) for a *building* not provided with a fire department connection, a fire department pumper vehicle can be located so that the length of the access route from a hydrant to the vehicle plus the unobstructed path of travel for the fire fighter from the vehicle to the *building* is not more than 90 m, and

(c) the unobstructed path of travel for the fire fighter from the vehicle to the *building* is not more than 45 m.

(3) The unobstructed path of travel for the fire fighter required by Sentence (2) from the vehicle to the *building* shall be measured from the vehicle to the fire department connection provided for the *building*, except that if no fire department connection is provided, the path of travel shall be measured to the principal entrance of the *building*.

(4) If a portion of a *building* is completely cut off from the remainder of the *building* so that there is no access to the remainder of the *building*, the access routes required by Sentence (2) shall be located so that the unobstructed path of travel from the vehicle to one entrance of each portion of the *building* is not more than 45 m.

3.2.5.6. Access Route Design

(1) A portion of a roadway or yard provided as a required access route for fire department use shall,

(a) have a clear width not less than 6 m, unless it can be shown that lesser widths are satisfactory,

(b) have a centreline radius not less than 12 m,

(c) have an overhead clearance not less than 5 m,

(d) have a change of gradient not more than 1 in 12.5 over a minimum distance of 15 m,

(e) be designed to support the expected loads imposed by fire fighting equipment and be surfaced with concrete, asphalt or other material designed to permit accessibility under all climatic conditions,

(f) have turnaround facilities for any dead-end portion of the access route more than 90 m long, and

(g) be connected with a public thoroughfare.

3.2.5.7. Water Supply

(1) An adequate water supply for fire fighting shall be provided for every *building*.

(2) Hydrants shall be located within 90 m horizontally of any portion of a *building* perimeter that is required to face a *street* in Subsection 3.2.2.

3.2.5.8. Reserved

3.2.5.9. Reserved

3.2.5.10. Reserved

3.2.5.11. Reserved

3.2.5.12. Reserved

3.2.5.13. Automatic Sprinkler Systems

(1) Except as permitted by Sentences (2) to (4), an automatic sprinkler system shall be designed, constructed, installed and tested in conformance with NFPA 13, "Installation of Sprinkler Systems".

(2) Instead of the requirements of Sentence (1), NFPA 13R, "Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height", is permitted to be used for the design, construction, installation and testing of an automatic sprinkler system installed in a *building*,

(a) of *residential occupancy* that is not more than 4 *storeys* in *building height* or

(b) of Group B, Division 3 *occupancy* that contains sleeping accommodation for not more than 10 persons and not more than 6 occupants require assistance in evacuation in case of an emergency.

(3) Instead of the requirements of Sentence (1), NFPA 13D, "Installation of Sprinkler Systems in One- and Two-Family Dwellings and Mobile Homes", is permitted to be used for the design, construction, installation and testing of an automatic sprinkler system installed in a *building* of *residential occupancy* that contains not more than 2 *dwelling units*.

(4) If a *building* contains fewer than 9 sprinklers, the water supply for these sprinklers is permitted to be supplied from the domestic water system for the *building* provided the required flow for the sprinklers can be met by the domestic system.

(5) If a water supply serves both an automatic sprinkler system and a system serving other equipment, control valves shall be provided so that either system can be shut off independently.

(6) Notwithstanding the requirements of the standards referenced in Sentences (1) and (2) for the installation of automatic sprinkler systems, sprinklers shall not be omitted in any room or closet in the *storey* immediately below a roof assembly if the *fire-resistance rating* of the roof assembly is waived as permitted by Article 3.2.2.17.

(7) Fast response sprinklers shall be installed in *care or detention occupancies* and in *sprinklered residential occupancies*.

(8) Sprinklers in elevator machine rooms shall have a temperature rating not less than that required for an intermediate temperature classification and shall be protected against physical damage.

3.2.5.14. Combustible Sprinkler Piping

(1) *Combustible* sprinkler piping shall be used only for wet systems in *residential occupancies* and other light hazard *occupancies*.

(2) *Combustible* sprinkler piping shall meet the requirements of ULC/ORD-199P-M, "Combustible Piping for Sprinkler Systems".

(3) Except as permitted by Sentence (5), *combustible* sprinkler piping shall be separated from the area served by the sprinkler system, and from any other *fire compartment*, by ceilings, walls, or soffits consisting of, as a minimum,

(a) lath and plaster,

(b) gypsum board not less than 9.5 mm thick,

(c) plywood not less than 13 mm thick, or

(d) a suspended membrane ceiling with,

  (i) steel suspension grids, and

  (ii) lay-in panels or tiles having a mass not less than 1.7 kg/m^2.

(4) Except as permitted by Sentence (5), *combustible* sprinkler piping may be located above a ceiling, provided that the distance between the edge of any ceiling opening that is not protected in conformance with Sentence (3) and the nearest sprinkler is not more than 300 mm.

(5) The protection required by Sentences (3) and (4) is permitted to be waived where *combustible* sprinkler piping has been tested in conformance with ULC/ORD-C199P-M, "Combustible Piping for Sprinkler Systems", and has been shown to meet the requirements in that document without additional protection.

3.2.5.15. Sprinklered Service Space

(1) An automatic sprinkler system shall be installed in a *service space* referred to in Sentence 3.2.1.1.(9) if flooring for access within the *service space* is other than catwalks.

(2) The sprinkler system required by Sentence (1) shall be equipped with waterflow detecting devices, with each device serving not more than one *storey*.

(3) The waterflow detecting devices required by Sentence (2) shall be connected to the fire alarm system, to

(a) initiate an *alert signal* in a 2 stage system or an *alarm signal* in a single stage system, and

(b) indicate separately on the fire alarm system annunciator the actuation of each device.

(4) If a *building* is *sprinklered*, sprinkler protection need not be provided in the space below a raised floor in a *computer room*,

(a) if the optical fibre cables and electrical wires and cables in this space conform to the test requirements in Article 3.1.5.21.,

(b) if the *building* is of *noncombustible construction* and other *combustible* components are limited to those permitted in Subsection 3.1.5.,

(c) if this space is used to circulate conditioned air and the air handling system is designed to prevent the circulation of smoke upon a signal from a *smoke detector*,

(d) if all of this space is easily accessible by providing access sections or panels in the raised floor, and

(e) if the *computer room* is more than 2 000 m^2 and the annunciator has separate zone indicators of the actuation of *smoke detectors* located in this space so that the coverage for each zone is not more than 2 000 m^2.

(5) Where a room, chute or bin is required to be *sprinklered* as indicated in Sentence 3.3.4.3.(1), Article 3.6.2.5. and Sentence 3.6.3.3.(6), the sprinklers may be supplied with water from the fire standpipe system provided that,

(a) except for a chute, not more than 8 sprinkler heads are required to protect any room or bin based on a maximum coverage of 12 m^2 per sprinkler head,

(b) the standpipe riser is,

  (i) not less than 6 in. in diameter, or

  (ii) hydraulically designed to meet combined water supply as specified in Clause (c),

(c) the water supply for a standpipe system, pumping capability and water storage facility, if required, is increased to supply 95 L/min for each sprinkler head over and above the requirements for the standpipe system up to maximum 760 L/min for sprinklers,

(d) a waterflow detecting device shall be installed in the sprinkler main adjacent to the point of connection to the standpipe riser, and

(e) the activation of each waterflow detecting device in Clause (d) shall be indicated separately on the fire alarm system annunciator.

3.2.5.16. Fire Department Connections

(1) The fire department connection for a standpipe system shall be located so that the distance from the fire department connection to a hydrant is not more than 45 m and is unobstructed.

(2) The fire department connection for an automatic sprinkler system shall be located so that the distance from the fire department connection to a hydrant is not more than 45 m and is unobstructed.

(3) The fire department connections required in Sentences (1) and (2) shall be,

(a) located on the outside of a *building* adjacent to a *street* or an access route, not less than 300 mm and not more than 900 mm above ground level, and

(b) provided with two 65 mm hose connections with female swivel hose couplings.

3.2.5.17. Portable Fire Extinguishers

(1) Portable fire extinguishers shall be installed in all *buildings*, except within *dwelling units*, in conformance with the provisions of Part 6 of the Fire Code made under the *Fire Protection and Prevention Act, 1997*.

(2) In a Group B, Division 1 *major occupancy*, portable fire extinguishers are permitted to be located in secure areas, or in lockable cabinets provided,

(a) identical keys for all cabinets are located at all supervisory or security stations, or

(b) electrical remote release devices are provided and are connected to an emergency power supply.

3.2.5.18. Protection from Freezing

(1) Equipment forming part of a fire protection system shall be protected from freezing if,

(a) it could be adversely affected by freezing temperatures, and

(b) it is located in an unheated area.

3.2.5.19. Fire Pumps

(1) A fire pump having a rated net head pressure greater than 280 kPa shall be installed in accordance with the requirements of NFPA 20, "Installation of Stationary Pumps for Fire Protection".

3.2.6. Additional Requirements for High Buildings

3.2.6.1. Application

(1) This Subsection applies to a *building*,

(a) of Group A, D, E or F *major occupancy* classification that is more than,

  (i) 36 m high, measured between *grade* and the floor level of the top *storey*, or

  (ii) 18 m high, measured between *grade* and the floor level of the top *storey*, and in which the cumulative or total *occupant load* on or above any *storey* above *grade*, other than the first *storey*, divided by 1.8 times the width in metres of all *exit* stairs at that *storey*, exceeds 300,

(b) containing a Group B *major occupancy* in which the floor level of the highest *storey* of that *major occupancy* is more than 18 m above *grade*,

(c) containing a *floor area* or part of a *floor area* located above the third *storey* designed or intended as a Group B, Division 2 or 3 *occupancy*, and

(d) containing a Group C *major occupancy* whose floor level is more than 18 m above *grade*.

3.2.6.2. Limits to Smoke Movement

(1) Except as permitted in Sentence 3.2.6.6.(2), a *building* to which this Subsection applies shall be designed in accordance with Sentences (2) to (4) and Articles 3.2.6.3. to 3.2.6.7. to limit the danger to occupants and fire fighters from exposure to smoke in a *building* fire.

(2) Except as provided in Articles 3.2.6.4. to 3.2.6.6., a *building* referred to in Sentence (1), shall be designed so that, during a period of 2 h after the start of a fire, all *floor areas* that are above the lowest *exit storey* will not contain more than 1% by volume of contaminated air from the fire floor, assuming an outdoor temperature equal to the January design temperature on a 2.5% basis determined in conformance with Supplementary Standard SB-1.

(3) Except as provided in Articles 3.2.6.4 and 3.2.6.6., a *building* referred to in Sentence (1), shall be designed so that during a period of 2 h after the start of a fire, the limit described in Sentence (2) on the movement of contaminated air into other *floor areas* is not exceeded in,

(a) each *exit* stair serving *storeys* above the lowest *exit level*, and

(b) each *exit* stair serving *storeys* below the lowest *exit level*.

(4) Except as provided in Articles 3.2.6.4. and 3.2.6.6., a *building* referred to in Sentence (1), shall be designed so that during a period of 2 h after the start of a fire, the limit described in Sentence (2) on the movement of contaminated air into other *floor areas* is not exceeded in a shaft that contains an elevator for use by fire fighters required by Article 3.2.6.9.

3.2.6.3. Areas of Refuge

(1) In a *building* of Group C *major occupancy* classification, the requirements of Sentence 3.2.6.2.(2) are waived in *buildings* where occupants above the *first storey* can enter and be safely accommodated in *floor areas* or parts of *floor areas* that are designated as areas of refuge on the plans and are identified as such in the *building*.

(2) Except as required in Sentence (3), the areas of refuge referred to in Sentence (1) shall be located on every fifth *storey*.

(3) The areas of refuge referred to in Sentence (1) shall be located on every *storey* if the *building* is more than 75 m high, measured between *grade* and the floor level of the top *storey*.

(4) The areas of refuge referred to in Sentence (1) shall,

(a) provide not less than 0.5 m^2 of floor space per ambulatory occupant and 1.5 m^2 of floor space per non-ambulatory occupant,

(b) have access corridors and doors leading to each designated part of a *floor area* on the same *storey* sufficient to provide 3.67 mm of width for every person who may have to use these passages to reach the designated part of a *floor area*,

(c) have access stairs from intervening *storeys* leading to each designated part of a *floor area* sufficient to provide 5.5 mm of width for every person who may have to use these stairs to reach the designated part of a *floor area*, and

(d) not contain more than 1% by volume of contaminated air from the fire floor during a period of 2 h after the start of a fire, assuming an outdoor temperature equal to the January design temperature on a 2.5% basis determined in conformance with Supplementary Standard SB-1.

3.2.6.4. Sprinklered Buildings

(1) The requirements of Sentences 3.2.6.2.(2) and (4), and Clause 3.2.6.2.(3)(a) are waived when a *building* is *sprinklered* and,

(a) the sprinkler system is equipped with a water flow and supervisory signal system that will,

(i) transmit automatically a waterflow signal directly to the fire department, or through an independent central station,

(ii) transmit automatically other supervisory signals to a proprietary control centre or to an independent central station, and

(iii) actuate a signal at the central alarm and control facility described in Article 3.2.6.12.,

(b) each stairway that serves *storeys* above the lowest *exit level* is vented to the outdoors at or near the bottom of the stair shaft,

(c) measures are taken to limit movement of smoke from a fire in a *floor area* below the lowest *exit storey* into upper *storeys*, and

(d) except for exhaust fans in kitchens, washrooms and bathrooms in *dwelling units*, and except for fans used for smoke venting in Article 3.2.6.10., air moving fans in a system that serves more than 2 *storeys* shall be designed and installed so that in the event of a fire these fans can be stopped by means of a manually operated switch at the central alarm and control facility.

3.2.6.5. Exception for Lower Buildings

(1) The requirements of Sentence 3.2.6.2.(2) are waived in a *building* of Group C *major occupancy* classification where,

(a) the *building* is not more than 75 m high measured between *grade* and the floor level of the top *storey*, and

(b) the number of occupants of *storeys* above *grade* is not more than 3.6 times the area in square metres of treads and landings in the *exit* stairs serving these *storeys*.

3.2.6.6. Residential Buildings

(1) The requirements of Sentences 3.2.6.2.(2) and (4) and Clause 3.2.6.2.(3)(a) are waived in a *building* of Group C *major occupancy* classification,

(a) where each *suite* above *grade* has direct access to an exterior balcony that conforms to the requirements of Sentence 3.3.1.7.(7),

(b) where each stairway that serves *storeys* above the lowest *exit level* is vented to the outdoors at or near the bottom of the stair shaft,

(c) where measures are taken to limit movement of smoke from a fire in a *floor area* below the lowest *exit storey* into upper *storeys*, and

(d) where, except for exhaust fans in kitchens, washrooms and bathrooms in *dwelling units*, air moving fans are designed and installed so that in the event of a fire such fans can be stopped by means of a manually operated switch at the central alarm and control facility where the system serves more than 2 *storeys*.

(2) The requirements of Sentences 3.2.6.2.(2) and (3) are waived in a Group C *major occupancy* apartment *building*.

3.2.6.7. Connected Buildings

(1) If a *building* described in Sentence 3.2.6.1.(1) is connected to any other *building*, measures shall be taken to limit movement of contaminated air from one *building* into another during a fire.

3.2.6.8. Emergency Operation of Elevators

(1) Manual emergency recall shall be provided for all elevators serving *storeys* above the *first storey*.

(2) Key-operated switches for emergency recall described by Sentence (1) shall be provided in a conspicuous location at,

(a) each elevator lobby on the recall level, and

(b) the central alarm and control facility required in Article 3.2.6.12.

(3) In-car emergency service switches shall be provided in all elevator cars.

(4) Keys to operate the switches required by Sentences (2) and (3) shall be,

(a) provided in a suitably identified box conspicuously located on the outside of an elevator hoistway near the central alarm and control facility required by Article 3.2.6.12., and

(b) at the central alarm and control facility.

(5) Automatic emergency recall operation shall be provided for all elevators serving *storeys* above the *first storey* in unsprinklered *buildings*.

(6) The automatic emergency recall feature in Sentence (5) shall be actuated by,

(a) *smoke detectors* installed in each elevator lobby on each *storey*, or

(b) the *building* fire alarm system.

(7) *Smoke detectors* in Sentence (6) shall be designed as part of the *building* fire alarm system.

3.2.6.9. Elevator for Use by Fire Fighters

(1) At least one elevator shall be provided for use by fire fighters in conformance with Sentences (2) to (6).

(2) The elevator referred to in Sentence (1) shall have a usable platform area not less than 2.2 m^2 and shall be capable of carrying a load of 900 kg to the top floor that it serves from a landing on the *storey* containing the entrance for fire fighter access referred to in Articles 3.2.5.4. and 3.2.5.5. within 1 min.

(3) Except when Measure K of Supplementary Standard SB-4 is used, each elevator for use by fire fighters shall,

(a) be provided with a *closure* at each shaft opening so that the interlock mechanism remains mechanically engaged and electrical continuity is maintained in the interlock circuits and associated wiring is operational for a period of not less than 1 h when the assembly is subjected to the standard fire exposure described in CAN4-S104-M, "Fire Tests of Door Assemblies",

(b) be protected with a vestibule containing no *occupancy* and separated from the remainder of the *floor area* by a *fire separation* having a *fire-resistance rating* not less than 45 min, or

(c) be protected with a corridor containing no *occupancy* and separated from the remainder of the *building* by a *fire separation* having a *fire-resistance rating* not less than 1 h.

(4) Except as permitted in Sentence (5), an elevator referred to in Sentence (1) shall be capable of providing transportation from the *storey* containing the entrance for fire fighter access referred to in Articles 3.2.5.4. and 3.2.5.5. to every floor that is above *grade* in the *building* and that is normally served by the elevator system.

(5) If it is necessary to change elevators to reach any floor referred to in Sentence (4), the system shall be designed so that not more than one change of elevator is required when travelling to any floor in the *building* from the *storey* containing the entrance for fire fighter access referred to in Articles 3.2.5.4. and 3.2.5.5.

(6) Electrical conductors for the operation of the elevator referred to in Sentence (1) shall be,

(a) installed in *service spaces* conforming to Section 3.6. that do not contain other *combustible* material, or

(b) protected against exposure to fire from the service entrance of the emergency power supply, or the normal service entrance of the normal power supply, to the equipment served, to ensure operation for a period of 1 h when subjected to the standard fire exposure described in CAN4-S101-M, "Fire Endurance Tests of Building Construction and Materials".

3.2.6.10. Venting to Aid Fire Fighting

(1) Means of venting each *floor area* to the outdoors shall be provided by windows, wall panels or smoke shafts, except that in a *sprinklered floor area*, the *floor area* is permitted to be vented by the *building* exhaust system.

(2) Venting described in Sentence (1) shall conform to the requirements in Supplementary Standard SB-4.

(3) Fixed glass windows shall not be used for the venting required by Sentence (1) if the breaking of the windows could endanger pedestrians below.

(4) Openable windows used for the venting required by Sentence (1) shall be permanently marked so that they are easily identifiable.

(5) Elevator hoistways shall not be designed for the venting required by Sentence (1).

3.2.6.11. Reserved

3.2.6.12. Central Alarm and Control Facility

(1) A central alarm and control facility shall be provided on the *storey* containing the entrance for fire fighter access referred to in Articles 3.2.5.4. and 3.2.5.5. in a location that,

(a) is readily accessible to fire fighters entering the *building*, and

(b) takes into account the effect of background noise likely to occur under fire emergency conditions, so that the facility can properly perform its required function under such conditions.

(2) The central alarm and control facility required in Sentence (1) shall include,

(a) means to control the voice communication system required by Article 3.2.6.13., so that messages can be sent to,

- (i) all loudspeakers simultaneously
- (ii) to individual *floor areas*, and
- (iii) *exit* stairwells,

(b) means to indicate audibly and visually *alert signals* and *alarm signals* and a switch to,

(i) silence the audible portion of these signals, and

(ii) indicate visually that the audible portion has been silenced,

(c) means to indicate visually that elevators are on emergency recall,

(d) an annunciator conforming to Article 3.2.4.8.,

(e) means to transmit *alert signals* and *alarm signals* to the fire department in conformance with Article 3.2.4.7.,

(f) means to release hold-open devices on doors to vestibules,

(g) means to manually actuate *alarm signals* in the *building* selectively to any zone or zones,

(h) means to silence the *alarm signals* referred to in Clause (g) in conformance with Sentences 3.2.4.22.(2) and (3),

(i) means, as appropriate to the measure for fire safety provided in the *building*, to,

(i) actuate auxiliary equipment, or

(ii) communicate with a continually staffed auxiliary equipment control centre,

(j) means to communicate with telephones in elevator cars, separate from connections to fire fighters' telephones, if elevator cars are required by the *Elevating Devices Act* to be equipped with a telephone,

(k) means to indicate visually, individual sprinkler system waterflow signals,

(l) means to indicate audibly and visually, sprinkler system supervisory signals,

(m) a switch to silence the audible portion of a supervisory signal, and

(n) visual indication that the audible portion of a supervisory signal has been silenced.

3.2.6.13. Voice Communication System

(1) A voice communication system or systems conforming to Article 3.2.4.22. shall be provided in a *building* if,

(a) the floor of the top *storey*, is more than 36 m above *grade*, or

(b) a *floor area* or part of a *floor area* located above the third *storey* is designed or intended for use as a Group B, Division 2 or 3 *occupancy*.

3.2.6.14. Testing

(1) The systems for control of smoke movement and mechanical venting required by Articles 3.2.6.2. and 3.2.6.10. shall be tested to ensure satisfactory operation in accordance with the procedures described in Supplementary Standard B-4.

3.2.7. Lighting and Emergency Power Systems

3.2.7.1. Minimum Lighting Requirements

(1) An *exit*, a *public corridor*, a corridor providing *access to exit* for the public, a corridor serving patients or residents in a Group B, Division 2 or Division 3 *occupancy*, a corridor serving classrooms, an electrical equipment room, a transformer vault and a hoistway pit shall be equipped to provide illumination to an average level not less than 50 lx at floor or tread level and at angles and intersections at changes of level where there are stairs or ramps.

(2) Rooms and spaces used by the public shall be illuminated as described in Article 9.34.2.7.

(3) Lighting outlets in a *building* of *residential occupancy* shall be provided in conformance with Subsection 9.34.2.

(4) Elevator machine rooms shall be equipped to provide illumination to an average level of not less than 100 lx at floor level.

(5) Every place of assembly intended for the viewing of motion pictures or the performing arts, shall be equipped to provide an average level of illumination at floor level in the aisles of not less than 2 lx during the viewing.

(6) Every area where food is intended to be processed, prepared or manufactured and where equipment or utensils are intended to be cleaned shall be equipped to provide illumination to a level of not less than 500 lx measured at the floor level.

(7) Every storage room, dressing room, sanitary facility, service area and corridor serving the areas in Sentence (6) shall be equipped to provide illumination to a level of not less than 300 lx measured at the floor level.

3.2.7.2. Recessed Lighting Fixtures

(1) A recessed lighting fixture shall not be located in an insulated ceiling unless the fixture is designed for this type of installation.

3.2.7.3. Emergency Lighting

(1) Emergency lighting shall be provided to an average level of illumination not less than 10 lx at floor or tread level in,

(a) *exits*,

(b) principal routes providing *access to exit* in an open *floor area* and in *service rooms*,

(c) corridors used by the public,

(d) corridors serving patients' or residents' sleeping rooms in a Group B, Division 2 or Division 3 *occupancy*,

(e) corridors serving classrooms,

(f) underground *walkways*,

(g) *public corridors*,

(h) *floor areas* or parts of them where the public may congregate in,

  (i) Group A, Division 1 *occupancies*, or

  (ii) Group A, Division 2 and 3 *occupancies* having an *occupant load* of 60 or more,

(i) *floor areas* or parts of them in day care centres where persons are cared for,

(j) food preparation areas in commercial kitchens,

(k) principal routes providing *access to exit* in a *floor area* that is not subdivided into rooms or *suites* of rooms served by corridors in a *business and personal services occupancy*, a *mercantile occupancy* or an *industrial occupancy*, and

(l) internal corridors or aisles serving as principal routes to *exits* in a *business and personal services occupancy*, a *mercantile occupancy* or an *industrial occupancy* that is subdivided into rooms or *suites* of rooms, and is not served by a *public corridor*.

(2) Emergency lighting to provide an average level of illumination of not less than 10 lx at floor or catwalk level shall be included,

(a) in a *service space* referred to in Sentence 3.2.1.1.(9), and

(b) on a *shelf and rack storage system* referred to in Sentence 3.16.1.4.(2).

(3) The minimum value of the illumination required by Sentences (1) and (2) shall be not less than 1 lx.

(4) In addition to the requirements of Sentences (1) to (3), the installation of battery-operated emergency lighting in health care facilities shall conform to the appropriate requirements of CSA Z32, "Electrical Safety and Essential Electrical Systems in Health Care Facilities".

3.2.7.4. Emergency Power for Lighting

(1) An emergency power supply shall be,

(a) provided to maintain the emergency lighting required by this Subsection from a power source such as batteries or generators that will continue to supply power in the event that the regular power supply to the *building* is interrupted, and

(b) so designed and installed that upon failure of the regular power it will assume the electrical load automatically for a period of,

  (i) 2 h for a *building* within the scope of Subsection 3.2.6.,

  (ii) 1 h for a *building* of Group B *major occupancy* classification that is not within the scope of Subsection 3.2.6., and

  (iii) 30 min for a *building* of any other *occupancy*.

(2) If self-contained emergency lighting units are used, they shall conform to CSA C22.2 No. 141, "Unit Equipment for Emergency Lighting".

3.2.7.5. Emergency Power Supply Installation

(1) Except as required by Articles 3.2.7.6. and 3.2.7.7., an emergency electrical power system shall be installed in conformance with CSA C282, "Emergency Electrical Power Supply for Buildings".

3.2.7.6. Emergency Power for Hospitals

(1) Except as required by Article 3.2.7.7., an emergency electrical power system for emergency equipment required by this Part for health care facilities shall be installed in conformance with CSA Z32, "Electrical Safety and Essential Electrical Systems in Health Care Facilities".

3.2.7.7. Fuel Supply Shut-off Valves and Exhaust Pipes

(1) If a liquid or gas fuel-fired engine or turbine for an emergency electric power supply is dependent on a fuel supply from outside the *building*, the fuel supply shall be provided with a suitably-identified separate shut-off valve outside the *building*.

(2) Where pipes for exhaust gases from emergency power systems penetrate required *fire separations*, they shall be enclosed in a separate *service space* having a *fire-resistance rating* equal to that of the penetrated floor assembly, but not less than 45 min.

3.2.7.8. Emergency Power for Fire Alarm Systems

(1) Fire alarm systems, including those incorporating a voice communication system, shall be provided with an emergency power supply conforming to Sentences (2) to (4).

(2) The emergency power supply required by Sentence (1) shall be supplied from,

(a) a generator,

(b) batteries, or

(c) a combination of the items described in Clauses (a) and (b).

(3) The emergency power supply required by Sentence (1) shall be capable of providing,

(a) supervisory power for not less than 24 h, and

(b) immediately following, emergency power under full load for not less than,

  (i) 2 h for a *building* within the scope of Subsection 3.2.6.,

  (ii) 1 h for a *building* classified as Group B *major occupancy* that is not within the scope of Subsection 3.2.6.,

  (iii) 5 min for a *building* not required to be equipped with an annunciator, and

  (iv) 30 min for any other *building*.

(4) The emergency power supply required by Sentence (1) shall be designed so that, in the event of a failure of the normal power source, there is an immediate automatic transfer to emergency power with no loss of information.

3.2.7.9. Emergency Power for Building Services

(1) An emergency power supply capable of operating under a full load for not less than 2 h shall be provided by an emergency generator for,

(a) every elevator serving *storeys* above the *first storey* in a *building* that is more than 36 m high measured between *grade* and the floor level of the top *storey* and every elevator for fire fighters in conformance with Sentence (2),

(b) water supply for fire fighting in conformance with Article 3.2.5.7., if the supply is dependent on electrical power supplied to the *building*, and the *building* is within the scope of Subsection 3.2.6.,

(c) fans and other electrical equipment that are installed to maintain the air quality specified in Article 3.2.6.2., and

(d) fans required for venting by Article 3.2.6.10.

(2) Except as permitted by Sentence (3), the emergency power supply for elevators required by Clause (1)(a) shall be capable of operating all elevators for fire fighters plus one additional elevator simultaneously.

(3) Sentence (2) does not apply if the time to recall all elevators under emergency power supply is not more than 5 min, each from its most remote *storey* to,

(a) the *storey* containing the entrance for fire fighter access referred to in Articles 3.2.5.4 and 3.2.5.5., or

(b) to a transfer lobby.

(4) Except as provided by Sentence (5), an emergency power supply capable of operating under a full load for not less than 30 min shall be provided by emergency generator for water supply for fire fighting in conformance with Article 3.2.5.7., if the supply is dependent on electrical power supplied to the *building*, and the *building* is not within the scope of Subsection 3.2.6.

(5) Sentence (4) does not apply to the water supply for a standpipe system.

3.2.7.10. Protection of Electrical Conductors

(1) Electrical conductors that are used in conjunction with fire alarm systems and with emergency equipment described in Articles 3.2.6.2. to 3.2.6.8., and Sentences 3.3.3.6.(1) and 3.3.3.7.(4) shall conform to Sentences (2) to (8).

(2) Except as permitted by Sentences (6) to (8), electrical conductors referred to in Sentence (1) shall conform to ULC-S139, "Fire Test for Evaluation of Integrity of Electrical Cables", including hose stream application, to provide a circuit integrity rating of not less than 1 h.

(3) The electrical conductors referred to in Sentence (2) are those that extend from the source of emergency power to,

(a) the equipment served, or

(b) the distribution equipment supplying power to the equipment served if both are in the same room.

(4) If a fire alarm transponder or annunciator is connected to, but located in, a different *fire compartment* than the central processing unit or another transponder, all wiring between the transponder or annunciator and the central processing unit or other transponder shall be protected against exposure to fire in accordance with Sentence (2).

(5) If a panelboard supplies power to emergency lighting, the power supply conductors to the panelboard shall be protected against exposure to fire in accordance with Sentence (2).

(6) Electrical conductors located in a *service space* that contains no other *combustible* material and is separated from the remainder of the *building* by a *fire separation* that has a *fire-resistance rating* not less than 1 h need not conform to Sentence (2).

(7) Fire alarm system branch circuits within a *storey* that connect transponders and individual devices need not conform to Sentence (2).

(8) Wiring from a panelboard referred to in Sentence (5) to emergency lighting units in the same *storey* need not conform to Sentence (2).

3.2.8. Mezzanines and Openings through Floor Assemblies

3.2.8.1. Application

(1) Except as permitted by Article 3.2.8.2. and Sentence 3.3.4.2.(3), the portions of a *floor area* or a *mezzanine* that do not terminate at an exterior wall, a *firewall* or a vertical shaft shall,

(a) terminate at a vertical *fire separation* having a *fire-resistance rating* not less than that required for the floor assembly and extending from the floor assembly to the underside of the floor or roof assembly above, or

(b) be protected in conformance with the requirements of Articles 3.2.8.3. to 3.2.8.11.

(2) The penetration of a floor assembly by an *exit* or a *vertical service space* shall conform to the requirements of Sections 3.4. to 3.6.

(3) A *floor area* containing sleeping rooms in a building of Group B, Division 2 or 3 *major occupancy* shall not be constructed as part of an *interconnected floor space*.

(4) Except as permitted in Sentence (5), an elementary or secondary school shall not,

(a) contain an *interconnected floor space*, or

(b) be located in an *interconnected floor space*.

(5) An *interconnected floor space* is permitted in an elementary or secondary school provided,

(a) the *interconnected floor space* consists of the *first storey*, and the *storey* next above or below it, but not both,

(b) the *interconnected floor space* is *sprinklered*,

(c) the portions of the upper *floor area* that do not terminate at an exterior wall, a *firewall* or a vertical shaft shall terminate at a vertical *fire separation* extending from the floor assembly to the underside of the floor or roof assembly above,

(d) except as provided in Clause (e), the *fire separation* required in Clause (c) need not have a *fire-resistance rating*,

(e) where a corridor is located immediately adjacent to the *fire separation* required in Clause (c), the *fire separation* shall have a *fire-resistance rating* of not less than 30 min, and

(f) where a portion of a *floor area* is not within the *interconnected floor space*, the required *access to exit* from this portion of the *floor area* shall not lead through the *interconnected floor space*.

3.2.8.2. Exceptions to Special Protection

(1) A *mezzanine* need not terminate at a vertical *fire separation* nor be protected in conformance with the requirements of Articles 3.2.8.3. to 3.2.8.11. provided the *mezzanine*,

(a) serves a Group A, Division 1 *major occupancy*,

(b) serves a Group A, Division 3 *major occupancy* in a *building* not more than 2 *storeys* in *building height*,

(c) serves a Group A, C, D, E or F *major occupancy* and the *mezzanine* conforms to Sentence 3.2.1.1.(3) or (4),

(d) is not considered a *storey* in Sentence 3.2.1.1.(4) in calculating *building height* provided the *mezzanine* is not more than 500 m^2 in area and does not contain a Group B *occupancy*, or

(e) is not considered a *storey* in calculating *building height* in Sentence 3.2.1.1.(8).

(2) Except for floors referred to in Sentence 3.1.10.3.(1) and Article 3.2.1.2., openings through a horizontal *fire separation* for vehicular ramps in a *storage garage* are not required to be protected with *closures* and need not conform to this Subsection.

(3) If a *closure* in an opening in a *fire separation* would disrupt the nature of a manufacturing process, such as a continuous flow of material from *storey* to *storey*, the *closure* for the opening is permitted to be omitted provided precautions are taken to offset the resulting hazard.

(4) An *interconnected floor space* in a Group B, Division 1 *occupancy* need not conform to the requirements of Articles 3.2.8.3. to 3.2.8.11. provided the *interconnected floor space* does not interconnect more than 2 adjacent *storeys*.

(5) Except as permitted by Sentence (6), openings for stairways, escalators and inclined moving walks need not conform to the requirements in Articles 3.2.8.3. to 3.2.3.11. provided,

(a) the opening for each stairway, escalator or walk does not exceed 10 m^2,

(b) the *building* is *sprinklered* throughout, and

(c) the *interconnected floor space* contains only Group A, Division 1, 2 or 3, Group D or Group E *occupancies*.

(6) An *interconnected floor space* need not conform to the requirements of Articles 3.2.8.3. to 3.2.8.11. provided,

(a) the *interconnected floor space* consists of the *first storey* and the *storey* next above or below it, but not both,

(b) the *interconnected floor space* is *sprinklered*, and

(c) the *interconnected floor space* contains only Group A, Division 1, 2 or 3, Group D, Group E, or Group F, Division 2 or 3 *occupancies*.

3.2.8.3. Configuration

(1) In *buildings* constructed in conformance with Articles 3.2.8.4. to 3.2.8.11., the *unprotected openings* through floor assemblies in an *interconnected floor space* shall be of sufficient size and shall be positioned relative to each other so as to be capable of containing, within the full height of the *interconnected floor space*, a cylinder conforming to Sentence (2).

(2) The cylinder referred to in Sentence (1) shall have a cross-section that, where taken at a right angle to the longitudinal axis of such cylinder, is,

(a) a circle at least 9 m in diameter, or

(b) an ellipse at least 7 m wide along the minor axis and at least 65 m^2 in area.

3.2.8.4. Exits

(1) A *building* that is more than 18 m in height, measured between *grade* and the floor level of the top *storey*, and that contains an *interconnected floor space*, shall be designed to limit the passage of smoke from a fire into *exit* stairshafts opening into an *interconnected floor space* so that during a 2 h period after the start of fire, such stairshafts will not contain more than 1% by volume of contaminated air from the fire floor, assuming an outdoor temperature equal to the January design temperature on a 2.5% basis.

(2) Where a *building* containing an *interconnected floor space* is more than 75 m in height, measured between *grade* and the floor level of the top *storey*, the *exit* stairshaft protection required in Sentence (1) shall be accomplished by the provision, between each *floor area* and each *exit* stairshaft, of a vestibule provided with a mechanical air supply or with a vent opening to the outdoors.

(3) Where a vestibule protecting an *exit* stairshaft is incorporated into the design of the *building* to meet the requirements of Sentences (1) or (2), such vestibule shall,

(a) be designed so that each doorway for a door opening into the vestibule is located at least 1 800 mm from a door or doors opening outward from the vestibule,

(b) be separated from the remainder of the *floor area* by a *fire separation* having a *fire-resistance rating* at least equal to that required for the *exit* that it serves except that the *fire-resistance rating* of a *fire separation* between the vestibule and a *public corridor* need not exceed 45 min, and

(c) not have a door or doors opening into more than one *exit* stairshaft.

(4) Except where *exits* serving the *floor area* are at ground level, the increased travel distance to *exits* permitted by Clause 3.4.2.5.(1)(c) shall not apply to a *floor area* within an *interconnected floor space*.

(5) Where a portion of a *floor area* is not within an *interconnected floor space*, required *access to exit* from such portion of a *floor area* shall not lead through an *interconnected floor space*.

(6) Except as provided in Sentences (7) and (8), portions of an *interconnected floor space* that have floor levels more than 18 m above *grade* shall be served by *exits* that provide at least 0.3 m^2 of area of treads, landings and floor surface for each occupant of such portions of an *interconnected floor space.*

(7) The requirements of Sentence (6) need not be applied where a *floor area* that is a portion of an *interconnected floor space* and that has a floor level more than 18 m above *grade* is separated from the remainder of the *interconnected floor space* by a *fire separation* having a *fire-resistance rating* of at least 1 h, except that no *fire-resistance rating* is required for such *fire separation* where all of the *major occupancies* contained within the *interconnected floor space* may be classified as light hazard *occupancies* in conformance with Appendix A of NFPA 13 "Installation of Sprinkler Systems".

(8) The requirements of Sentence (6) need not be applied where the *exit* stairs that serve *interconnected floor spaces* are designed so that the required width of each stair is cumulative.

3.2.8.5. Elevators

(1) Except as provided in Sentence (2), where an elevator shaft opens into an *interconnected floor space* and into *storeys* that are above such space and that have floor levels more than 18 m above *grade*, either the elevator doors opening into the *interconnected floor space* or the elevator doors opening into the *storeys* above the *interconnected floor space* shall be protected by vestibules that,

(a) are designed to restrict the passage of contaminated air to the limit described in Sentence 3.2.8.4.(1), and

(b) conform to the requirements of Sentence 3.2.8.4.(3).

(2) Where elevator doors opening into an *interconnected floor space* are protected by vestibules in conformance with Sentence (1), the elevator doors opening into the lowest *storey* of the *interconnected floor space* need not be protected by such vestibules.

3.2.8.6. Group B Sleeping Rooms

(1) Openings provided for access between an *interconnected floor space* and a *building* or a portion of a *building* containing Group B *major occupancy* sleeping rooms shall be provided with vestibules that are provided with a mechanical air supply and that are designed,

(a) to restrict the passage of smoke from the *interconnected floor space* into the area containing sleeping rooms in accordance with the limits described in Sentence 3.2.8.4.(1), and

(b) in conformance with Clause 3.2.8.4.(3)(a).

3.2.8.7. Sprinklers

(1) In a *building* containing an *interconnected floor space*, *storeys* that are wholly or partially within an *interconnected floor space* and all *storeys* below an *interconnected floor space* shall be *sprinklered.*

(2) In a *building* containing an *interconnected floor space*,

(a) waterflow alarm signals from sprinkler systems shall be transmitted to the fire department in conformance with Sentence 3.2.4.7.(4), and

(b) sprinkler systems shall be electrically supervised as required in Sentence 3.2.4.9.(2).

3.2.8.8. Fire Alarm and Detection System

(1) A *building* containing an *interconnected floor space* shall be provided with,

(a) a fire alarm system and electrically supervised annunciator conforming to Subsection 3.2.4.,

(b) a system of *smoke detectors* located,

  (i) on the ceiling of each *storey* in the vicinity of the openings through floor assemblies described in Article 3.2.8.3., except within *dwelling units*, *heat detectors* may be installed instead of *smoke detectors*, and

  (ii) as required for the activation of the smoke control system described in Sentences (5), (6) and (7) of Article 3.2.8.9., and

(c) facilities for transmitting a signal to the fire department in conformance with Article 3.2.4.7.

3.2.8.9. Smoke Control

(1) A smoke control system conforming to Sentences (2) to (8) shall be designed to control the movement of smoke within a *building* containing an *interconnected floor space.*

(2) The design of the smoke control system shall assume an outdoor temperature equal to the January design temperature on a 2.5% basis.

(3) Upon activation of the sprinkler system or automatic detection of smoke by at least two *smoke detectors* in a single zone within an *interconnected floor space*, the system shall,

(a) stop air moving fans that provide for the normal exhausting or re-circulating of air in an *interconnected floor space*,

(b) activate *exit* stairshaft protection required in Article 3.2.8.4.,

(c) activate elevator protection required in Article 3.2.8.5., and

(d) activate the vestibule air supply required in Sentence 3.2.8.6.(1).

(4) A *building* containing an *interconnected floor space* may be designed so that, in the event of a fire arising in a *floor area* or part of a *floor area* within the *interconnected floor space*, automatic detection of such fire will activate air handling equipment that,

(a) extracts air directly from such *floor area* or part of a *floor area* at the rate of at least 6 air changes per hour, and

(b) supplies air in sufficient quantities and at appropriate locations to prevent smoke from passing out of such *floor area* into other portions of the *interconnected floor space*.

(5) For purposes of Sentences (6) and (7), the volume of an *interconnected floor space* need not include the aggregate volume of those *floor areas* or portions of *floor areas* designed to have zoned air extraction in accordance with Sentence (4).

(6) A mechanical exhaust shall be provided to remove air at the top of an *interconnected floor space* at the rate of at least 6 air changes per hour, except that where the volume of the *interconnected floor space* exceeds 17 000 m^3, only 4 air changes per hour need be provided.

(7) Except where zoned mechanical exhaust described in Sentence (4) has been activated, upon automatic detection of smoke within the volume of the *interconnected floor space*, the mechanical exhaust described in Sentence (6) shall be automatically activated and supply air shall be provided in sufficient quantity and at appropriate locations to allow a consistent rate of removal of smoke throughout the volume of the *interconnected floor space*.

(8) Overriding manual controls for the smoke control system shall be provided for fire department use at an acceptable location in the vicinity of the fire alarm annunciator.

3.2.8.10. Emergency Power Supply

(1) In a *building* that is more than 18 m in height, measured between *grade* and the floor level of the top *storey*, an emergency power supply capable of operating under a full load for at least 2 h shall be provided by an emergency generator or by a separate service not supplied by the same substation as the primary source for fans required for smoke control purposes in Articles 3.2.8.4., 3.2.8.5., 3.2.8.6. and 3.2.8.9.

3.2.8.11. Testing

(1) The systems for smoke control and venting described in Articles 3.2.8.4., 3.2.8.5., 3.2.8.6. and 3.2.8.9. shall be tested to ensure satisfactory operation.

3.2.9. Standpipe Systems

3.2.9.1. Where Required

(1) Except as provided in Sentences (4) to (7), a standpipe system shall be installed in every *building* that,

(a) is more than 3 *storeys* in *building height*,

(b) is more than 14 m high measured between *grade* and the ceiling of the top *storey*, or

(c) is not more than 14 m high measured between *grade* and the ceiling of the top *storey* but has a *building area* exceeding the area shown in Table 3.2.9.1. for the applicable *building height* if the *building* is not *sprinklered*.

(2) A standpipe system shall be installed in every *basement* of a *building* that requires a standpipe system above *grade*.

(3) A standpipe system shall be installed in every *basement* of a *building* that is regulated by Sentence 3.2.2.15.(2).

Table 3.2.9.1.
Building Limits without Standpipe Systems

Forming Part of Sentence 3.2.9.1.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
Occupancy Classification	*Building Area*, m^2		
	1 *Storey*	2 *Storeys*	3 *Storeys*
A	2 500	2 000	1 500
C	2 000	1 500	1 000
D	4 000	3 000	2 000
F, Division 2	2 000	1 500	1 000
F, Division 3	3 000	2 000	1 000

(4) A standpipe system is not required to be installed in the lowest *storey* in a *building* if this *storey* is a *service room* that has an area not more than 50 m^2.

(5) A standpipe system is not required to be installed in a roof-top enclosure if this enclosure has an area not more than 50 m^2.

(6) A standpipe system is not required to be installed in a *storage garage* conforming to Article 3.2.2.83. provided the *building* is not more than 15 m high.

(7) A standpipe system is not required to be installed in a *dwelling unit* that,

(a) extends not more than 3 *storeys* above adjacent ground level,

(b) is completely cut off from the remainder of the *building* so that there is no access to the remainder of the *building*, and

(c) has direct access to its interior by means of an exterior doorway located not more than 1 500 mm above or below adjacent finished ground level.

3.2.9.2. Standpipe System Design

(1) Except as otherwise provided in this Subsection, if a standpipe system is required, the design, construction, installation and testing of the system shall be in conformance with NFPA 14, "Installation of Standpipe and Hose Systems".

(2) A dry standpipe that is not connected to a water supply shall not be considered as fulfilling the requirements of this Article.

(3) If more than one standpipe is provided, the total water supply need not be more than 30 L/s.

(4) The residual water pressure at the design flow rate at the hydraulically most remote hose connection of a standpipe system that is required to be installed in a *building* is permitted to be less than 450 kPa provided that,

(a) the *building* is *sprinklered*,

(b) the water supply at the base of the sprinkler riser is capable of meeting the design flow rate and pressure demand of the sprinkler system, including the inside and outside hose allowance, and

(c) fire protection equipment is available to deliver, by means of the fire department connection, the full demand flow rate at a residual water pressure of 450 kPa at the hydraulically most remote hose connection of the standpipe system.

(5) A fire department connection shall be provided for every standpipe system.

(6) Pumps required to have a rated net head pressure greater than 280 kPa and their controllers shall be *listed* and labelled.

(7) Couplings for hoses or other fittings used in connection with such couplings shall conform to ULC-S513, "Threaded Couplings for 38 mm and 65 mm Fire Hose" or ULC-S543, "Internal Lug Quick Connect Couplings for Fire Hose".

(8) If freezing of piping may occur, a dry standpipe system may be provided and so arranged through the use of *listed* devices to,

(a) automatically admit water to the system by opening of a hose valve, and

(b) transmit a signal to an attended location.

(9) A standpipe riser shall be located in,

(a) an *exit* stair shaft, or

(b) a *service space*.

3.2.9.3. Hose Connections

(1) If a standpipe system is required in a *building*, 38 mm diam hose connections shall be provided in each *storey* in the *building*.

(2) In addition to the requirements in Sentence (1), if a standpipe system is required, 65 mm diam hose connections shall be installed in each *storey* in the *building* if the *building*,

(a) is more than 25 m high, measured between *grade* and the ceiling of the top *storey*, or

(b) has a *building area* of more than 4 000 m^2.

3.2.9.4. Hose Stations

(1) If a standpipe system is required in a *building*, hose stations shall be provided in each *storey* in the *building*.

(2) Each hose station shall be equipped with a hose rack filled with not more than 30 m of 38 mm diam fire hose and the hose rack and fire hose shall be,

(a) *listed*, or

(b) approved by the Factory Mutual Research Corporation.

(3) Except in a Group F *occupancy*, at each hose station, hose connections, valves, fire hose, nozzle and hose rack shall be in a hose cabinet.

(4) A hose cabinet referred to in Sentence (3) shall be of sufficient size to,

(a) contain the equipment referred to in Sentence (3),

(b) contain a *listed* fire extinguisher, and

(c) provide sufficient clearance to permit the use of a standard fire department hose key.

(5) Hose stations shall be located,

(a) so that every portion of the *building* can be reached by a hose stream and is within 3 m of a nozzle attached to the hose required in Sentence (2),

(b) not more than 5 m from every required *exit* serving a *floor area*, except,

  (i) for the *first storey*, or

  (ii) if additional hose stations are required to achieve full coverage of the *floor area*, and

(c) in a conspicuous location where they are not likely to be obstructed.

(6) Except as permitted in Sentence (7), hose stations shall be located so that it is not necessary to penetrate an *exit* with a hose in order to provide the design coverage required in Clause (5)(a).

(7) A hose is permitted to penetrate an *exit* in order to provide the required coverage to,

(a) a *service room* referred to in Sentence 3.2.9.1.(4),

(b) a roof-top enclosure referred to in Sentence 3.2.9.1.(5),

(c) a room not more than 50 m^2 in area, or

(d) a room or group of rooms not more than 200 m^2 in area in a *sprinklered floor area*.

(8) A hose station located on one side of a *horizontal exit* shall be considered to serve only the *floor area* on that side of the *horizontal exit*.

(9) A hose cabinet shall be located so that its door, when fully opened, will not obstruct the required width of a *means of egress*.

(10) A hose station in a Group B, Division 1 *major occupancy* is permitted to be located in a secure area, or in a lockable cabinet provided that,

(a) identical keys for all cabinets are located at all guard stations, or

(b) electrical remote release devices are provided and are connected to an emergency power supply.

3.2.9.5. Supervisory Signal Annunciation for Valves

(1) If a fire alarm system in a *building* is required to have an annunciator by Sentence 3.2.4.8.(1), except for hose valves, each valve controlling water supplies in a standpipe system shall be equipped with an electrically supervised switch for transmitting a signal for individual annunciation in the event of movement of the valve handle.

3.2.9.6. Water Supply for 38 mm Hose Connections

(1) If a standpipe and hose system is required, the water supply shall be sufficient to provide a flow, measured at each of the two hydraulically most remote 38 mm diam hose connections,

(a) of not less than 380 L/min,

(b) for not less than 30 min,

(c) at a pressure of not less than 450 kPa, and

(d) of not less than 190 L/min from each of the two outlets simultaneously.

3.2.9.7. Water Supply for 65 mm Hose Connections

(1) If 65 mm diam hose connections are required, the water supply shall be sufficient to provide a flow, measured at each of the two hydraulically most remote 65 mm diam hose connections,

(a) of not less than 1 890 L/min,

(b) for not less than 30 min,

(c) at a pressure of not less than 450 kPa, and

(d) of not less than 945 L/min from each of the two outlets simultaneously.

(2) If the *building* is less than 84 m high, measured between *grade* and the ceiling level of the top *storey*, the water supply required in Sentence (1) is permitted to be supplied through the fire department connection.

(3) If the *building* is 84 m or more high, measured between *grade* and the ceiling level of the top *storey*, the water supply required in Sentence (1) shall be provided by sufficient pumping capacity.

(4) If the *building* is 84 m or more high, measured between *grade* and the ceiling level of the top *storey*, the *building* shall be served by no fewer than two sources of water supply from a public water system.

Section 3.3. Safety within Floor Areas

3.3.1. All Floor Areas

3.3.1.1. Separation of Suites

(1) Except as permitted by Sentences (2) and (3), each *suite* in other than *business and personal services occupancies* shall be separated from adjoining *suites* by a *fire separation* having a *fire-resistance rating* not less than 1 h.

(2) The *fire-resistance rating* of the *fire separation* required by Sentence (1) is permitted to be less than 1 h but not less than 45 min provided the *fire-resistance rating* required by Subsection 3.2.2. is permitted to be less than 1 h for,

(a) the floor assembly above the *floor area*, or

(b) the floor assembly below the *floor area*, if there is no floor assembly above.

(3) *Occupancies* that are served by *public corridors* conforming to Clause 3.3.1.4.(4)(b) in a *building* that is *sprinklered*, are not required to be separated from one another by *fire separations* provided the *occupancies* are,

(a) *suites* of *business and personal services occupancy*,

(b) fast food vending operations that do not provide seating for customers,

(c) *suites* of *mercantile occupancy*, or

(d) any combination of these *occupancies*.

3.3.1.2. Hazardous Substances, Equipment and Processes

(1) Except as provided in Subsection 3.3.5., the storage, handling and use of the hazardous substances shall be in conformance with,

(a) the Fire Code made under the *Fire Protection and Prevention Act, 1997*, or

(b) the National Fire Code of Canada, in the absence of regulations referred to in Clause (a).

(2) Cooking equipment, not within a *dwelling unit*, used in processes producing grease-laden vapours shall be designed and installed in conformance with Part 6.

(3) A fuel-fired *appliance* shall not be installed in a corridor serving as an *access to exit*.

3.3.1.3. Means of Egress

(1) *Access to exit* within *floor areas* shall conform to Subsections 3.3.2. to 3.3.5., in addition to the requirements of this Subsection.

(2) If a podium, terrace, platform or contained open space is provided, egress requirements shall conform to the appropriate requirements of Sentence 3.3.1.5.(1) for rooms and *suites*.

(3) *Means of egress* shall be provided from every roof that is intended for *occupancy*, and from every podium, terrace, platform or contained open space.

(4) At least two separate *means of egress* shall be provided from a roof, used or intended for an *occupant load* more than 60, to stairs designed in conformance with the *exit* stair requirements of Section 3.4.

(5) A rooftop enclosure shall be provided with an *access to exit* that leads to an *exit*,

(a) at the roof level, or

(b) on the *storey* immediately below the roof.

(6) A rooftop enclosure that is more than 200 m^2 in area shall be provided with at least 2 *means of egress*.

(7) Two points of egress shall be provided for a *service space* referred to in Sentence 3.2.1.1.(9) if,

(a) the area is more than 200 m^2, or

(b) the travel distance measured from any point in the *service space* to a point of egress is more than 25 m.

(8) Except as permitted by Sentences 3.3.4.4.(6) and (7), each *suite* in a *floor area* that contains more than one *suite* shall have,

(a) an exterior *exit* doorway, or

(b) a doorway,

  (i) into a *public corridor*, or

  (ii) to an exterior passageway.

(9) Except as permitted by this Section and by Sentence 3.4.2.1.(2), at the point where a doorway referred to in Sentence (8) opens onto a *public corridor* or exterior passageway, it shall be possible to go in opposite directions to each of 2 separate *exits*.

(10) *Means of egress* from a roof for personnel servicing roof top equipment or for a below ground *service room* that is not normally occupied, is permitted to be provided by stairways or fixed ladders.

3.3.1.4. Public Corridor Separations

(1) Except as otherwise required by this Part or as permitted by Sentence (4), a *public corridor* shall be separated from the remainder of the *storey* by a *fire separation*.

(2) Except as permitted by Sentence (3) and Clauses (4)(a) and (4)(b), the *fire separation* between a *public corridor* and the remainder of the *storey* shall have a *fire-resistance rating* not less than 45 min.

(3) If a *storey* is *sprinklered*, no *fire-resistance rating* is required for a *fire separation* between a *public corridor* and the remainder of the *storey* provided the corridor does not serve a *care occupancy or detention occupancy* or a *residential occupancy*.

(4) No *fire separation* is required in a *sprinklered floor area* between a *public corridor* and,

(a) except as required by Sentences 3.3.3.5.(10) and 3.3.4.2.(1) and notwithstanding Sentences 3.4.2.4.(2), the remainder of a *storey* provided the travel distance from any part of the *floor area* to an *exit* is not more than 45 m.,

(b) a room or *suite* provided the *public corridor* complies with Sentence 3.3.1.9.(6) and Clause 3.4.2.5.(1)(d), or

(c) a space containing *plumbing fixtures* required by Subsection 3.7.4. provided the space and the *public corridor* are separated from the remainder of the *storey* by a *fire separation* that has a *fire-resistance rating* not less than that required between the *public corridor* and the remainder of the *storey*.

(5) The sprinkler system in Sentences (3) and (4) shall be electrically supervised in conformance with Sentence 3.2.4.9.(2) and, upon operation, shall cause a signal to be transmitted to the fire department in conformance with Sentence 3.2.4.7.(4) when the corridor serves a Group E or Group F, Division 1 or 2 *occupancy*.

3.3.1.5. Egress Doorways

(1) Except for *dwelling units*, a minimum of 2 egress doorways located so that one doorway could provide egress from the room or *suite* as required by Article 3.3.1.3. if the other doorway becomes inaccessible to the occupants due to a fire that originates in the room or *suite*, shall be provided for every room and every *suite*,

(a) whose area is more than 15 m^2 and is used for,

  (i) a *high hazard industrial occupancy*, or

  (ii) a *hazardous room*,

(b) intended for an *occupant load* more than 60,

(c) in a *floor area* that is not *sprinklered* if,

  (i) the area of a room or *suite* is more than the value in Table 3.3.1.5.A., or

  (ii) the travel distance within the room or *suite* to the nearest egress doorway, is more than the value in Table 3.3.1.5.A.,

(d) in a *floor area* that is *sprinklered* and does not contain a *high hazard industrial occupancy* if,

  (i) the travel distance to an egress doorway is more than 25 m, or

  (ii) the area of the room or *suite* is more than the value in Table 3.3.1.5.B., or

(e) where the area of the room is more than 100 m^2 and it is a *hazardous classroom* in elementary or secondary school.

Table 3.3.1.5.A.
Egress in Floor Area, not Sprinklered

Forming Part of Sentence 3.3.1.5.(1)

COLUMN 1	COLUMN 2	COLUMN 3
Occupancy of Room or *Suite*	Maximum Area of Room or *Suite*, m^2	Maximum Distance to Egress Doorway, m
Group A	150	15
Group C	150(1)	25(1)
Group D	200	25
Group E	200	25
Group F, Division 2	200	25
Group F, Division 3	200	25

Note to Table 3.3.1.5.A.:

(1) See Article 3.3.4.4. for *dwelling units*.

(2) Except for a *mezzanine* within a *dwelling unit*, every *mezzanine* that is not required to terminate at a vertical *fire separation* in Article 3.2.8.2. shall have 2 egress facilities placed in such a manner that one facility could provide egress from the *mezzanine* if the other facility becomes inaccessible to the occupants of the *mezzanine* due to a fire that might originate in the room or *suite* in which the *mezzanine* is located,

(a) where the *occupancy* of the *mezzanine*, room or *suite* is classified as Group F, Division 1,

(b) where the *mezzanine* is intended for an *occupant load* of more than 60 persons,

(c) in a *floor area* that is not *sprinklered* if,

(i) the area of a *mezzanine* is more than the value in Table 3.3.1.5.A., or

(ii) the travel distance to an egress doorway or an egress facility is more than the value in Table 3.3.1.5.A., or

(d) in a *floor area* that is *sprinklered* if,

(i) the travel distance to an egress doorway or an egress facility is more than 25 m, or

(ii) the area of the *mezzanine* is more than the value in Table 3.3.1.5.B.

Table 3.3.1.5.B.
Egress in Sprinklered Floor Area

Forming Part of Sentence 3.3.1.5.(1)

COLUMN 1	COLUMN 2
Occupancy of Room or *Suite*	Maximum Area of Room or *Suite*, m^2
Group A	200
Group B, Division 1	100
Group B, Division 2 or 3	
sleeping rooms	100
other than sleeping rooms	200
Group C	150(1)
Group D	300
Group E	200
Group F, Division 2	200
Group F, Division 3	300

Note to Table 3.3.1.5.B.:

(1) See Article 3.3.4.4. for *dwelling units*.

(3) For the purpose of Clause (2)(c) and Clause 2(d),

(a) if the room or *suite* in which the *mezzanine* is located is permitted to have one egress doorway, the travel distance is measured from any point on the *mezzanine* to that doorway, or

(b) if the room or *suite* in which the *mezzanine* is located is required to have more than one egress doorway, the travel distance is measured from any point on the *mezzanine* to the nearest egress facility leading from the *mezzanine*.

(4) Except for a *mezzanine* which is not considered as a *storey* in calculating *building height* in Sentence 3.2.1.1.(4), where the space below a *mezzanine* is enclosed, an egress facility from the *mezzanine* shall not lead into the enclosed space.

3.3.1.6. Travel Distance

(1) If more than one egress doorway is required from a room or *suite* referred to in Article 3.3.1.5., the travel distance within the room or *suite* to the nearest egress doorway shall not exceed the maximum travel distances specified in Clauses 3.4.2.5.(1)(a), (b), (c) and (f) for *exits*.

3.3.1.7. Protection on Floor Areas with a Barrier-Free Path of Travel

(1) Except as provided in Sentences (2) and (3), every *floor area* above or below the *first storey* that has a *barrier-free* path of travel shall,

(a) be served by an elevator,

  (i) conforming to Sentences 3.2.6.9.(4) to (6),

  (ii) protected against fire in conformance with Clauses 3.2.6.9.(3)(b) or (c), and

  (iii) in a *building* over 3 *storeys* in *building height*, protected against smoke movement so that the hoistway will not contain more than 1% by volume of contaminated air from a fire floor during a period of 2 h after the start of a fire, assuming an outdoor temperature equal to the January design temperature on a 2.5% basis determined in conformance with Supplementary Standard SB-1, or

(b) be divided into at least 2 zones by *fire separations* conforming to Sentences (4) to (6) so that,

  (i) persons with physical disabilities can be accommodated in each zone,

  (ii) the travel distance from any point in one zone to a doorway leading to another zone shall be not more than the value for travel distance permitted by Sentence 3.4.2.5.(1) for the *occupancy* classification of the zone, and

  (iii) a b*arrier-free* path of travel is provided to an *exit*.

(2) In *residential occupancies*, the requirements of Sentence (1) are waived if a balcony conforming to Sentence (7) is provided for each *suite*, except for *suites* on the *storey* containing the *barrier-free* entrance described in Article 3.8.1.2.

(3) The requirements of Sentences (1) and (2) are waived when the *building* is *sprinklered*.

(4) Except as permitted by Sentence (5), the *fire separations* referred to in Clause (1)(b) shall have a *fire-resistance rating* not less than 1 h.

(5) The *fire-resistance rating* of the *fire separations* referred to in Clause (1)(b) is permitted to be less than 1 h but not less than 45 min provided the *fire-resistance rating* required by Subsection 3.2.2. is permitted to be less than 1 h for,

(a) the floor assembly above the *floor area*, or

(b) the floor assembly below the *floor area*, if there is no floor assembly above.

(6) A door acting as a *closure* in a *fire separation* referred to in Clause (1)(b) shall be weatherstripped or otherwise designed and installed to retard the passage of smoke.

(7) A balcony required by Sentence (2) shall,

(a) be provided with a door way having a clear width of not less that 800 mm when the door is in the open position,

(b) have no projection above the walking surface more than 13 mm,

(c) be not less than 1500 mm deep from the outside face of the exterior wall to the inside edge of the balcony, and

(d) provide not less than 0.5 m^2 for each occupant of the *suite*.

3.3.1.8. Headroom Clearance

(1) Except within the *floor area* of a *storage garage*, the minimum headroom clearance in every *access to exit* shall conform to the requirements of Article 3.4.3.6. for *exits*.

3.3.1.9. Corridors

(1) The minimum width of a *public corridor* shall be 1 100 mm.

(2) Except as required by Sentences 3.3.3.3.(2) and (3), the minimum unobstructed width shall be 1 100 mm for every,

(a) corridor used by the public,

(b) corridor serving classrooms, and

(c) corridor in a Group B, Division 2 or 3 *occupancy* where the corridor

  (i) serves a *service room*,

  (ii) serves an administrative area,

(iii) will not be used by non-ambulatory outpatients, or

(iv) will not be used by non-ambulatory residents.

(3) Except as permitted by Sentence (4), obstructions located within 1 980 mm of the floor shall not project more than 100 mm horizontally in a manner that would create a hazard for a person with a visual disability traveling adjacent to the walls in,

(a) an *exit* passageway,

(b) a *public corridor*,

(c) a corridor used by the public,

(d) a corridor serving classrooms, or

(e) a corridor serving patients' or residents' sleeping rooms in a Group B, Division 2 or Division 3 *occupancy*.

(4) The horizontal projection of an obstruction referred to in Sentence (3) is permitted to be more than 100 mm provided the clearance between the obstruction and the floor is less than 680 mm.

(5) If a corridor contains an *occupancy*, the *occupancy* shall not reduce the unobstructed width of the corridor to less than its required width.

(6) If a *public corridor* conforming to Clause 3.4.2.5.(1)(d) contains an *occupancy*,

(a) the *occupancy* shall be located so that for pedestrian travel there is an unobstructed width not less than 3 m at all times adjacent and parallel to all rooms and *suites* that front onto the *public corridor*, and

(b) the combined area of all *occupancies* in the *public corridor* shall be not more than 15% of the area of the *public corridor*.

(7) Except as provided in Sentence 3.3.3.3.(1), a dead end corridor shall conform to Sentences (8) to (14).

(8) A dead end corridor is permitted in an *assembly occupancy* where there is a second and separate egress doorway from each room or *suite* not leading into a dead end corridor.

(9) In a *residential occupancy*, except for corridors served by a single *exit* as described in Sentence 3.3.4.4.(7), a dead end *public corridor* is permitted provided it is not more than 6 m long.

(10) Dead end corridors in Sentence (9) shall contain no door openings to *service rooms* containing fuel-fired *appliances* or rooms that may be considered a hazard.

(11) A dead end *public corridor* is permitted in a *business and personal services occupancy* where,

(a) the dead end corridor,

(i) serves an *occupant load* of not more than 30 persons,

(ii) is not more than 9 m long, and

(iii) is provided with doors having self-closing devices, or

(b) there is a second and separate egress doorway from each room or *suite* not leading into a dead end corridor.

(12) A dead end corridor is permitted in a *mercantile occupancy* where,

(a) the dead end corridor,

(i) serves an *occupant load* of not more than 30 persons,

(ii) is not more than 9 m long, and

(iii) is provided with doors having self-closing devices, or

(b) there is a second and separate egress doorway from each room or *suite* not leading into a dead end corridor.

(13) A dead end corridor is permitted in a *low* or *medium hazard industrial occupancy* where,

(a) the dead end corridor

(i) serves an *occupant load* of not more than 30 persons,

(ii) is not more than 9 m long, and

(iii) is provided with doors having self-closing devices, or

(b) there is a second and separate egress doorway from each room or *suite* not leading into a dead end corridor.

(14) A dead end corridor is permitted in a *high hazard industrial occupancy* where there is a second and separate egress doorway from each room or *suite* not leading into a dead end corridor.

(15) Except as otherwise required by this Section, aisles shall be provided in conformance with the Fire Code made under the *Fire Protection and Prevention Act, 1997.*

3.3.1.10. Door Swing

(1) Except as permitted by Article 3.3.1.11., a door that opens into a corridor or other facility providing *access to exit* from a *suite*, or a room not located within a *suite*, shall swing on a vertical axis.

(2) Except as permitted by Article 3.3.1.11., a door that opens into a corridor or other facility providing *access to exit* from a room or *suite* shall swing in the direction of travel to the *exit* if the room or *suite* is used or intended for,

(a) an *occupant load* more than 60,

(b) a *high hazard industrial occupancy*, or

(c) a *hazardous classroom* in an elementary or secondary school.

(3) Every door that divides a corridor that is not wholly contained within a *suite* shall swing on a vertical axis in the direction of travel to the *exit* where the corridor provides *access to exit* for,

(a) an *occupant load* more than 60,

(b) a *high hazard industrial occupancy*,

(c) a *hazardous classroom* in an elementary or secondary school, or

(d) a Group B, Division 2 or 3 *occupancy*.

(4) If a pair of doors is installed in a corridor that provides *access to exit* in both directions, the doors shall swing in opposite directions, with the door on the right hand side swinging in the direction of travel to the *exit*.

3.3.1.11. Sliding Doors

(1) Except as permitted by Sentence (2), a sliding door provided in the locations described in Article 3.3.1.10. shall,

(a) be designed and installed to swing on the vertical axis in the direction of travel to the *exit* when pressure is applied, and

(b) be identified as a swinging door by means of a label or decal affixed to it.

(2) In a Group B, Division 1 *occupancy*, or in an *impeded egress zone* in other *occupancies*, sliding doors used in an *access to exit* need not conform to Sentence (1) and Article 3.3.1.10.

(3) Movable *partitions* used to separate a *public corridor* from an adjacent *business and personal services occupancy* or a *mercantile occupancy* need not conform to Sentence (1) and Sentences 3.3.1.10.(1) and (2) provided the *partitions* are not located in the only *means of egress*

3.3.1.12. Doors and Door Hardware

(1) A door that opens into or is located within a *public corridor* or other facility that provides *access to exit* from a *suite* shall,

(a) provide a clear opening of not less than 800 mm if there is only one door leaf,

(b) in a doorway with multiple leaves, have the active leaf providing a clear opening of not less than 800 mm, and

(c) not open onto a step.

(2) A door in an *access to exit* shall be readily openable in travelling to an *exit* without requiring keys, special devices or specialized knowledge of the door opening mechanism, except that this requirement does not apply to a door serving a *contained use area*, or an *impeded egress zone*, provided the locking devices conform to Sentence (6).

(3) Except as permitted by Sentence (4), door release hardware shall be operable by one hand and the door shall be openable with not more than one releasing operation.

(4) An egress door from an individual *dwelling unit* or from a *suite* of *residential occupancy* is permitted to be provided with additional devices that require a releasing operation additional to the main door release hardware, provided the devices are readily operable from the inside without the use of keys, special devices or specialized knowledge.

(5) Door release hardware shall be installed not more than 1 200 mm above the finished floor.

(6) An egress door in an *access to exit* serving a *contained use area* or an *impeded egress zone* is permitted to be equipped with locking devices that can be released either locally or remotely in conformance with Sentence (7) or Sentence (8).

(7) Local locking devices permitted by Sentence (6) shall be operable by a key from both sides of the door.

(8) Controls for the remote release of door locking devices permitted by Sentence (6) shall be located in an area readily available to security personnel.

(9) Locking devices permitted by Sentence (6) that are electrically operated shall be,

(a) designed to operate on emergency power, and

(b) capable of manual release by security personnel.

(10) A door in an *access to exit* is permitted to be equipped with an electromagnetic locking device conforming to Sentence 3.4.6.15.(4), except that this permission does not apply to a door,

(a) in an elementary or secondary school,

(b) a door leading from a Group F, Division 1 *occupancy*, or

(c) except as provided in Sentence (11), requiring a latch release device by Article 3.3.2.6.

(11) A door in an *access to exit* in a *gaming premise* is permitted to be equipped with an electromagnetic locking device conforming to Sentences 3.4.6.15.(4) and (7).

(12) Except as required in Article 3.3.3.4., in a Group B, Division 2 or 3 *occupancy*, every door that opens into or is located within a corridor or other facility that provides *access to exit* shall comply with Sentences (1) and (2) where the door,

(a) serves a *service room*,

(b) serves an administrative area,

(c) will not be used by non-ambulatory outpatients,

(d) is located within a patient's or resident's sleeping room, or

(e) is in a nursing home or home for the aged that will accommodate only ambulatory residents.

3.3.1.13. Ramps and Stairways

(1) Except as permitted by Sentence (2), Article 3.3.4.7., and Subsection 3.3.2., ramps and stairways that do not serve as *exits* shall conform to the dimensional, *guard*, handrail and slip-resistance requirements for *exit* ramps and stairways of Sentence 3.4.3.2.(7), and Articles 3.4.3.5., and 3.4.6.1. to 3.4.6.8.

(2) Ramps and stairways that do not conform to the requirements of Sentence (1) and are intended only for occasional use for servicing equipment and machinery are permitted,

(a) to serve *service rooms* and *service spaces*, and

(b) in *industrial occupancies*.

3.3.1.14. Exterior Passageways

(1) An exterior passageway leading to a required *exit* shall conform to the requirements of Section 3.4. for exterior *exit* passageways.

3.3.1.15. Curved or Spiral Stairs

(1) A curved or spiral stair is permitted in a stairway not required as an *exit* provided the stair has,

(a) treads with,

  (i) a minimum run not less than 150 mm, and

  (ii) an average run not less than 200 mm, and

(b) risers in conformance with Sentence 3.4.6.7.(2).

3.3.1.16. Capacity of Access to Exits

(1) The capacity of an *access to exit* shall be based on the *occupant load* of the portion of the *floor area* served.

(2) In an *access to exit* the required width of ramps with a slope not more than 1 in 8, doorways, and corridors shall be based on not less than 6.1 mm per person.

(3) In an *access to exit* the required width of a ramp with a slope more than 1 in 8 shall be based on not less than 9.2 mm per person.

(4) In an *access to exit* from a *floor area* used or intended to be used for patients or residents in a Group B, Division 2 or Division 3 *occupancy*, the required width of corridors, doorways, and ramps shall be based on not less than 18.4 mm per person.

(5) The capacity of stairs in an *access to exit* shall conform to the requirements for stairs in Article 3.4.3.2.(1) to (3).

3.3.1.17. Guards

(1) Except as provided in Sentence (6) and Articles 3.3.2.8. and 3.3.4.7., a *guard* not less than 1 070 mm high shall be provided,

(a) around each roof to which access is provided for other than maintenance,

(b) at openings into smoke shafts referred to in Subsection 3.2.6. that are less than 1 070 mm above the floor, and

(c) at each raised floor, *mezzanine*, balcony, gallery, interior or exterior vehicular ramp, and at other locations where the difference in level is more than 600 mm.

(2) Except as provided in Sentence (3) and Sentence 3.3.2.8.(4), openings through any *guard* that is required by Sentence (1) shall be of a size that will prevent the passage of a sphere having a diameter more than 100 mm unless it can be shown that the location and size of openings that exceed this limit do not represent a hazard.

(3) Openings through any *guard* that is required by Sentence (1) and that is installed in a *building* of *industrial occupancy* shall be of a size which will prevent the passage of a sphere having a diameter more than 200 mm unless it can be shown that the location and size of openings that exceed this limit do not represent a hazard.

(4) Openings through any *guard* that is not required by Sentence (1) and that serves a *building* of other than *industrial occupancy*, shall be of a size that,

(a) will prevent the passage of a sphere having a diameter more than 100 mm, or

(b) will permit the passage of a sphere having a diameter more than 200 mm unless it can be shown that the location and size of openings that exceed these limits do not represent a hazard.

(5) Unless it can be shown that the location and size of openings do not present a hazard, a *guard* shall be designed so that no member, attachment or opening located between 140 mm and 900 mm above the level protected by the *guard* will facilitate climbing.

(6) Sentence (1) does not apply at the front edges of *stages*, floor pits in *repair garages* and loading docks.

3.3.1.18. Transparent Doors and Panels

(1) Except for *dwelling units* and as permitted by Sentence (4), a glass or transparent door shall be designed and constructed so that the existence and position of the door is readily apparent, by attaching non-transparent hardware, bars or other permanent fixtures to it.

(2) A glass door shall be constructed of,

(a) laminated or tempered safety glass conforming to CAN/CGSB-12.1-M, "Tempered or Laminated Safety Glass", or

(b) wired glass conforming to CAN/CGSB-12.11-M, "Wired Safety Glass".

(3) Except as permitted by Sentence (4), transparent panels used in an *access to exit* that, because of their physical configuration or design, could be mistaken as a *means of egress* shall be made inaccessible by barriers or railings.

(4) Sliding glass *partitions* that separate a *public corridor* from an adjacent *occupancy* and that are intended to be open during normal working hours need not conform to Sentences (1) and (3), provided the *partitions* are suitably marked to indicate their existence and position.

(5) Glass in doors and in sidelights that could be mistaken for doors, within or at the entrances to *dwelling units* and in public areas, shall conform to the requirements of Article 9.6.6.2.

(6) A window in a public area that extends to less than 1 070 mm above the floor and is located above the second *storey* in a *building* of *residential occupancy*, shall be protected by a barrier or railing from the floor to not less than 1 070 mm above the floor, or the window shall be non-openable and designed to withstand the lateral design loads for balcony *guards* required by Article 4.1.5.15.

3.3.1.19. Exhaust Ventilation

(1) An exhaust ventilation system designed in conformance with the appropriate requirements of Part 6 shall be provided in a *building* or part of a *building* in which dust, fumes, gases, vapour or other impurities or contaminants have the potential to create a fire or explosion hazard.

(2) Explosion relief devices, vents or other protective measures conforming to Subsection 6.2.2. shall be provided for a space in which substances or conditions that have the potential to create an explosion hazard are present as a result of the principal use of a *building*.

3.3.1.20. Janitors' Rooms

(1) Except as permitted by Sentences (2) and (3), a room or space within a *floor area* for the storage of janitorial supplies shall be separated from the remainder of the *building* by a *fire separation* having a *fire-resistance rating* not less than 1 h.

(2) The *fire-resistance rating* of the *fire separation* required by Sentence (1) is permitted to be not less than 45 min provided the *fire-resistance rating* required by Subsection 3.2.2. is permitted to be less than 1 h for,

(a) the floor assembly above the *floor area*, or

(b) the floor assembly below the *floor area*, if there is no floor assembly above.

(3) The *fire separation* required by Sentence (1) is not required to have a *fire-resistance rating* if the *floor area* in which the room or space is located is *sprinklered.*

3.3.1.21. Common Laundry Rooms

(1) Except as permitted by Sentences (2) and (3), in a *building* of *residential occupancy*, a laundry room in a *floor area* that is not within a *dwelling unit* shall be separated from the remainder of the *building* by a *fire separation* having a *fire-resistance rating* not less than 1 h.

(2) The *fire-resistance rating* of the *fire separation* required by Sentence (1) is permitted to be not less than 45 min provided the *fire-resistance rating* required by Subsection 3.2.2. is permitted to be less than 1 h for,

(a) the floor assembly above the *floor area*, or

(b) the floor assembly below the *floor area*, if there is no floor assembly above.

(3) The *fire separation* required by Sentence (1) is not required to have a *fire-resistance rating* if the *floor area* in which the laundry room is located is *sprinklered.*

3.3.1.22. Obstructions

(1) No obstruction shall be permitted in any *occupancy* that would restrict the width of a normal *means of egress* from any part of a *floor area* to less than 750 mm unless an unobstructed alternative *means of egress* is provided adjacent to, accessible from, and plainly visible from the obstructed *means of egress.*

3.3.1.23. Signs in Service Spaces

(1) Illuminated signs conforming to Sentences 3.4.5.1.(3) and (5) shall be provided to indicate the direction to egress points in a *service space* referred to in Sentence 3.2.1.1.(9).

3.3.1.24. Welding and Cutting

(1) Except as provided in Sentence (2), welding and cutting operations shall be located in a room,

(a) separated from the remainder of the *building* by a *fire separation* having a *fire-resistance rating* not less than 1 h, or

(b) protected by an automatic fire extinguishing system.

(2) Sentence (1) does not apply to an *industrial occupancy* where the welding and cutting operations do not present a fire or explosion hazard to adjacent areas.

3.3.2. Assembly Occupancy

3.3.2.1. Scope

(1) This Subsection applies to *assembly occupancies* and to outdoor places of assembly.

3.3.2.2. Fire Separations

(1) Except as permitted by Sentence (2), the seating area of a Group A, Division 1 *occupancy* shall be separated from adjacent *occupancies* in the *floor area* by a *fire separation* having a *fire-resistance rating* not less than 1 h if the *occupant load* in the seating area exceeds 200.

(2) The *fire-resistance rating* of the *fire separation* required by Sentence (1) is permitted to be less than 1 h but not less than 45 min provided the *fire-resistance rating* required by Subsection 3.2.2. is permitted to be less than 1 h for,

(a) the floor assembly above the *floor area*, or

(b) the floor assembly below the *floor area*, if there is no floor assembly above.

(3) If usable space exists under tiers of seats in arena type *buildings*, a *fire separation* with a *fire-resistance rating* not less than 45 min shall be provided between the space and the seats or the space shall be *sprinklered.*

(4) Except as required in Sentences (5), (6) and (7), in an elementary or secondary school, a *hazardous classroom* shall be separated from the remainder of the *building* by a *fire-separation* having a *fire-resistance rating* not less than,

(a) 1 h where the *building* is not *sprinklered*, or

(b) 30 min where the *building* is *sprinklered.*

(5) Except as provided in Sentence (6), in an elementary or secondary school, a *hazardous classroom* containing an auto repair shop shall be separated from the remainder of the *building* by a *fire-separation* having a *fire-resistance rating* not less than,

(a) 2 h where the *building* is not *sprinklered*, or

(b) 1 h where the *building* is *sprinklered.*

(6) In an elementary or secondary school, if there is a group of *hazardous classrooms* or a group of *hazardous classrooms* and ancillary rooms of a complementary use, the *fire separation* required by Sentence (4) or (5) need not be provided within the group but the *fire separation* is required between the group and the remainder of the *building*.

(7) In an elementary or secondary school, a *hazardous classroom* containing a spray painting operation shall be separated from the remainder of the *building* by a *fire separation* having a *fire-resistance rating* not less than,

(a) 2 h, or

(b) 1 h where the spray painting operation is separated from the classroom by a *fire-separation* having a *fire-resistance rating* not less than 1 h.

(8) Except as required in Sentence (9), in an elementary or secondary school, where the *occupant load* of a room exceeds 200 persons, the room and any ancillary rooms of a complementary use shall be separated from the remainder of the *building* by a *fire separation* having a *fire-resistance rating* not less than,

(a) 1 h where the *building* is not *sprinklered*, or

(b) 30 min where the *building* is *sprinklered*.

(9) A kitchen shall not be located within the *fire compartment* required in Sentence (8).

3.3.2.3. Fixed Seats

(1) Except for the requirements of Article 3.3.2.7. for bench-type seats and except as required or permitted by Sentence (2) and Articles 3.3.2.9. and 3.3.2.10., fixed seats in places of assembly shall be,

(a) attached or secured to the floor, platform or platform riser,

(b) provided with arms and back, and

(c) arranged in rows having an unobstructed passage not less than 400 mm wide measured horizontally between plumb lines from the backs of the seats in one row and the edges of the furthest forward projection of the seats in the next row in the unoccupied position.

(2) For fixed seats with backs and with folding tablet arms, the value of 400 mm required by Clause (1)(c) shall be measured when the tablet arms are in the use position, but is permitted to be measured in the stored position provided,

(a) there are not more than 7 seats between any seat and the nearest aisle,

(b) the seats are located in a lecture hall or an auditorium used for instructional purposes, and

(c) the tablet arm, when raised manually to a vertical position, falls by the force of gravity to the stored position.

(3) Except as permitted by Sentences (4) and (5), aisles shall be located so that there are not more than 7 seats with backs or 20 seats without backs between any seat and the nearest aisle.

(4) The requirements of Sentence (3) do not apply if,

(a) egress doorways are provided to serve both ends of rows of seats,

(b) each doorway referred to in Clause (a) serves not more than 3 rows of seats, and

(c) each row contains not more than 100 seats.

(5) The requirements of Sentence (3) do not apply if,

(a) there are not more than 7 seats between any seat and the nearest aisle, where the seats are served by a single aisle,

(b) there are not more than 20 seats between any seat and the nearest aisle, where the seats are served by two aisles,

(c) each row has an unobstructed passage with minimum width of 400 mm plus 6.1 mm for each additional seat above 16 seats in the row, and

(d) the travel distance is not more than 45 m measured along the path of travel from any seat to an *exit* or to an egress doorway.

(6) Seating arrangements that do not conform to the requirements of Sentences (3) to (5) are permitted provided the standard of safety is not reduced and the time required for egress is not increased.

3.3.2.4. Aisles

(1) Except as required by Articles, 3.3.2.9. and 3.3.2.10., aisles leading to egress doors or *exits* shall be provided in conformance with Sentences (2) to (27) in places of assembly that contain fixed seats.

(2) In this Subsection, a converging aisle is an aisle into which the occupants of 2 or more aisles converge in travelling to an *exit*.

(3) An aisle shall terminate at,

(a) a converging aisle,

(b) an egress doorway from the seating area, or

(c) an *exit* from the seating area.

(4) A converging aisle shall terminate at,

(a) an egress doorway from the seating area, or

(b) an *exit* from the seating area.

(5) The minimum clear width of aisles shall be not less than 1 100 mm , except that the width is permitted to be reduced to not less than,

(a) 750 mm if serving not more than 60 seats, and

(b) 900 mm if serving seats on one side only.

(6) The minimum clear width of each aisle shall be measured at the point in the aisle furthest from,

(a) an egress doorway referred to in Clause (15)(a),

(b) an *exit* referred to in Clause (15)(b), or

(c) an *exit* referred to in Sentence (16).

(7) Except for an aisle serving bleacher seats, where rows of seats discharge into an aisle, the minimum clear width required by Sentence (5) shall be increased by 25 mm for each metre of length of the aisle measured in the direction towards an *exit*.

(8) The width of a converging aisle shall be not less than the required width of the widest aisle plus 50% of the total required width of the remaining aisles that it serves.

(9) If rows of seats discharge directly into the converging aisle, the width required by Sentence (8) shall be increased by 25 mm for each metre of length of the aisle where the rows of seats discharge into the aisle.

(10) The width of an egress doorway or an *exit* leading directly from the seating area shall be not less than the required width of the widest aisle or converging aisle plus 50% of the total required width of the remaining aisles and converging aisles that it serves.

(11) The requirements in Sentences (5) to (10) and Sentence (17) do not apply if,

(a) the minimum clear width of an aisle is in accordance with Article 3.3.1.16., but is not less than 900 mm if serving seats on one side only,

(b) the minimum clear width of an aisle is in accordance with Article 3.3.1.16., but is not less than 1 200 mm if serving seats on both sides,

(c) the minimum clear width of a converging aisle is in accordance with Article 3.3.1.16., but not less than the width of the widest aisle leading to the converging aisle,

(d) the minimum clear width of an *exit* leading directly from the seating area is in accordance with Article 3.4.3.2.,

(e) except as provided in Clause (f), the minimum clear width of an egress doorway leading directly from the seating area is in accordance with Article 3.3.1.16., but not less than the required width of the aisle or the converging aisle leading to the doorway, and

(f) if more than one vomitory is provided,

  (i) the minimum total clear width of the egress doorways leading from one vomitory is not less than the required width of the aisle or the converging aisle leading to the doorways, and

  (ii) the minimum clear width of egress doorways from additional vomitories is in accordance with Article 3.3.1.16.

(12) Except as provided in Sentences (13) and (14), dead-end aisles shall be not more than 6 m long.

(13) Dead-end aisles are permitted to be more than 6 m long, but not more than 10 m long if,

(a) the seating area is separated from other seating areas and adjacent *occupancies*, including a corridor serving any seating area, by a *fire separation* in accordance with Sentences 3.3.2.2.(1) and (2),

(b) the travel distance is not more than 25 m measured along the path of travel from any seat to an *exit*, to an egress doorway or to an opening into a vomitory,

(c) at least one *means of egress*, comprising not less than 30 per cent of the required *exit* capacity, is through an exterior *exit*, an *exit* stairway or a corridor not containing an *occupancy*,

(d) each row served by the dead-end aisle has a minimum unobstructed width of 400 mm plus 6.1 mm for each additional seat above 7 seats in a row, but not more than 550 mm,

(e) the minimum ceiling height above the seating area is 3 m,

(f) the activation of a *fire detector* or a sprinkler head in the seating area will,

(i) cause the shutdown of the projection system serving the seating area, and

(ii) turn on the normal lighting in the seating area, and

(g) the *floor* area is *sprinklered*.

(14) Dead-end aisles are permitted to be more than 10 m long, but not more than 13 m long if,

(a) the seating area is separated from other seating areas and adjacent *occupancies*, including a corridor serving any seating area, by a *fire separation* in accordance with Sentences 3.3.2.2.(1) and (2),

(b) the travel distance is not more than 25 m measured along the path of travel from any seat to an *exit*, to an egress doorway or to an opening into a vomitory,

(c) at least one *means of egress*, comprising not less than 30 per cent of the required *exit* capacity, is through an exterior *exit*, an *exit* stairway or a corridor not containing an *occupancy*,

(d) each row served by a dead-end aisle has a minimum unobstructed width of 400 mm plus 6.1 mm for each additional seat above 7 seats in a row, but not more than 550 mm,

(e) the activation of a *fire detector* or a sprinkler head in the seating area will,

(i) cause the shutdown of the projection system serving the seating area, and

(ii) turn on the normal lighting in the seating area,

(f) a voice communication system is installed in conformance with Article 3.2.4.22.,

(g) a smoke control system is installed to control movement of smoke in the seating area or a smoke exhaust system is provided so that, in the event of detection of smoke by a *smoke detector* in the seating area, air handling equipment is activated to extract air directly from the seating area at the rate of at least 6 air changes per hour, and

(h) the *floor area* is *sprinklered*.

(15) Where a seating area is separated as required by Sentences 3.3.2.2.(1) and (2) or 3.3.2.2.(8), the length of travel by any aisle shall be not more than 45 m measured from the most remote point of the aisle to,

(a) an egress doorway in the required separation, or

(b) an *exit* leading directly from the seating area.

(16) Where a seating area is not required to be separated by Sentences 3.3.2.2.(1) and (2) or 3.3.2.2.(8), the travel distance shall be not more than 45 m measured from the most remote point of the aisle to an *exit*.

(17) Side aisles shall be not less than 1 100 mm wide if seating is provided in conformance with Sentence 3.3.2.3.(4).

(18) An aisle that has a slope not more than 1 in 8 shall not be stepped.

(19) An aisle that slopes more than 1 in 8 shall be stepped.

(20) The passageway between rows of seats served by a stepped aisle shall be level at right angles to the line of travel.

(21) The riser of a step in an aisle shall be,

(a) not less than 110 mm high, and

(b) not more than 200 mm high.

(22) Variations are permitted in riser height provided,

(a) the height of adjacent risers does not vary by more than 6 mm, and

(b) the depth of a tread or a platform in the direction of travel is not less than 430 mm.

(23) Steps in an aisle shall,

(a) have a run not less than 230 mm exclusive of nosings,

(b) have a tread depth not less than 250 mm,

(c) extend to the adjacent rows of seats in a manner that will not create a hazard from tripping, and

(d) have a finish on the treads conforming to Sentence 3.4.6.1.(1).

(24) The location of every riser in an aisle shall be made apparent from both directions of travel by strategically placed lighting or contrasting marking stripes.

(25) A platform in an aisle shall be level, except that a slope not more than 1 in 50 is permitted for a platform that is not less than 430 mm deep in the direction of *exit* travel.

(26) If a step is used at the entry to a row of seats from a stepped aisle, an unobstructed platform not less than 800 mm square shall be provided adjacent to the aisle.

(27) The finish of the surface of a platform in or adjacent to a stepped aisle shall conform to Sentence 3.4.6.1.(1).

3.3.2.5. Corridors

(1) Except as permitted by Sentences (2) to (4), a corridor used by the public in an *assembly occupancy* as an *access to exit* shall be separated from the remainder of the *building* by a *fire separation* having a *fire-resistance rating* not less than 1 h.

(2) The *fire-resistance rating* of the *fire separation* required by Sentence (1) is permitted to be less than 1 h but not less than 45 min provided the *fire-resistance rating* required by Subsection 3.2.2. is permitted to be less than 1 h for,

(a) the floor assembly above the *floor area*, or

(b) the floor assembly below the *floor area*, if there is no floor assembly above.

(3) The *fire-resistance rating* required by Sentence (1) is permitted to be waived if the *floor area* in which the corridor is located is *sprinklered*.

(4) The *fire separation* required by Sentence (1) is permitted to be waived if the distance from any point in the *floor area* to an *exit* measured along the path of travel to an *exit* does not exceed the travel distance permitted by Article 3.4.2.5.

3.3.2.6. Doors

(1) A door equipped with a latching mechanism in an *access to exit* from a room or *suite* of *assembly occupancy* containing an *occupant load* more than 100 shall be equipped with a device that will release the latch and allow the door to swing wide open when a force not more than that specified in Sentence 3.8.3.3.(7) is applied to the device in the direction of travel to the *exit*.

3.3.2.7. Fixed Bench-Type Seats without Arms

(1) If fixed bench-type seats without arms are provided, the seat width per person shall be assumed to be 450 mm.

(2) The centre-to-centre spacing between rows of bench-type seats shall be not less than 760 mm if back rests are provided, and not less than 550 mm if back rests are not provided.

(3) A clear space of not less than 300 mm shall be provided between the back of each seat and the front of the seat immediately behind it.

3.3.2.8. Guards

(1) Except as required by Sentences (2) to (4) for bleacher seats, *guards* shall be installed in outdoor and indoor places of assembly with fixed seats so that,

(a) at the fascia of every box, balcony or gallery where the seats extend to the edge, the height of *guards* is not less than,

  (i) 760 mm in front of the seats, and

  (ii) 920 mm if located at the end of aisles or at the foot of steps,

(b) the height of *guards* along every cross aisle other than those adjacent to the fascia of every box, balcony or gallery is not less than 660 mm, except that *guards* need not be provided if the backs of the seats along the front side of the aisle are not less than 600 mm above the floor of the aisle, and

(c) where the seating is arranged in successive tiers and the height of rise between platforms is more than 450 mm, the height of *guards* is not less than 660 mm along the entire row of seats at the edge of the platform.

(2) The backs and ends of bleacher seats more than 1 200 mm above the ground or floor that are not adjacent to a wall shall be protected with a *guard*,

(a) not less than 1 070 mm high above an adjacent aisle surface or foot rest, and

(b) not less than 920 mm high above the centre of an adjacent seat board.

(3) If the front of a bleacher is more than 600 mm above the ground or floor, it shall be protected with a *guard* not less than 840 mm high above the front foot rest.

(4) Openings through any *guard* that is required by Sentences (2) and (3) shall be of a size that will prevent the passage of a sphere having a diameter more than 300 mm.

3.3.2.9. Outdoor Places of Assembly

(1) A Group A, Division 4 *occupancy* and each tier or balcony that has a capacity of more than,

(a) 1 000 persons shall have no fewer than 3 separate *exits*, or

(b) 4 000 persons shall have no fewer than 4 separate *exits*.

(2) In a Group A, Division 4 *occupancy*, every seat shall be located so that the travel distance is not more than 45 m measured along the path of travel from the seat to,

(a) the ground,

(b) an *exit*,

(c) an opening to a passageway leading from the seating area, or

(d) a portal, a vomitory or any other opening through the seating deck structure.

(3) *Exits* from outdoor stadia or grandstands shall be located not more than 25 m apart.

(4) The capacity of a *means of egress* for a Group A, Division 4 *occupancy* shall conform to the requirements of Sentence 3.4.3.2.(3).

(5) Aisles in a Group A, Division 4 *occupancy*,

(a) shall be located so that there are not more than 20 seats between any seat and the nearest aisle and

(b) shall be not less than 1 200 mm wide, except that an aisle serving less than 60 persons is permitted to be 750 mm wide

3.3.2.10. Bleachers

(1) Steps provided in aisles of bleachers of the telescopic type shall,

(a) have risers not more than 250 mm high, and

(b) have treads with a run not less than 280 mm.

(2) If the vertical distance between seating platforms in bleachers is more than 280 mm, an intermediate step shall be provided the full width of the aisle and proportioned to provide 2 equal risers between platforms.

(3) If the vertical distance between seating platforms in bleachers is more than 450 mm, 2 intermediate steps shall be provided the full width of the aisle so that there are 3 equal risers between platforms.

(4) If the passageway between rows of seats is not a closed deck, footboards shall be provided so that,

(a) the total width of the footboards shall be not less than three quarters of the centre-to-centre spacing between rows of seats, and

(b) the spacing between footboard members shall be not more than 25 mm.

(5) Openings above footboards and below the seats in rows of bleachers shall be of a size that will prevent the passage of a sphere having a diameter more than 100 mm.

3.3.2.11. Libraries

(1) Except as permitted by Sentence (2), a library book storage room that is not normally accessible to the public shall be separated from the remainder of the *building* by a *fire separation* with a *fire-resistance rating* not less than 2 h if it,

(a) is more than 250 m^2 in area, or

(b) contains book stacks that,

 (i) are more than 10 m high, or

 (ii) penetrate more than one floor assembly.

(2) The *fire separation* required by Sentence (1) is not required if the book storage room is *sprinklered*.

(3) Open book shelves are permitted above and below a *mezzanine* floor in a library *building* provided the height of the shelves is not more than 2 100 mm but not more than 75% of the floor-to-ceiling height of the space above or below the *mezzanine* floor assembly.

3.3.2.12. Stages for Theatrical Performances

(1) A *stage* for theatrical performances and ancillary spaces, including workshops, dressing rooms and storage areas, shall be *sprinklered*.

(2) A *fire separation* with a *fire-resistance rating* not less than 1 h shall be provided between a *stage* for theatrical performances and ancillary spaces, including workshops, dressing rooms and storage areas.

(3) Except as permitted by Sentence (6), a *stage* for theatrical performances and ancillary spaces, including workshops, dressing rooms and storage areas, shall be separated from the seating area by a *fire separation* having a *fire-resistance rating* not less than 1 h, except for a proscenium opening protected with,

(a) a sprinkler deluge system conforming to the requirements of NFPA 13 "Installation of Sprinkler Systems",

(b) an unframed fire curtain if the opening is not more than 20 m wide, or

(c) a semi-rigid fire curtain if the opening is more than 20 m wide.

(4) A fire curtain required by Sentence (3) shall be of a type designed to close,

(a) automatically upon the actuation of the sprinkler system,

(b) automatically upon actuation of the fire alarm system,

(c) manually by remote control devices located at the curtain control panel and at each side of the *stage*, and

(d) automatically by heat-actuated devices.

(5) At least 2 vents for the purpose of venting fire and smoke to the outside of a *building* shall be provided above a *stage* designed for theatrical performances and shall,

(a) have an aggregate area not less than one eighth of the area of the *stage* behind the proscenium opening, and

(b) be arranged to open automatically upon actuation of the sprinkler system.

(6) The *fire separation* referred to in Sentence (3) is not required between a *stage* and a seating area in a *floor area* that is *sprinklered*, provided a sprinkler deluge system is installed at the boundary between the *stage* and the seating area.

3.3.2.13. Risers for Stairs

(1) In a Group A, Division 2 *occupancy* used for the serving of food and beverages, an interior flight of stairs with fewer than 3 risers is permitted provided it,

(a) is not less than 900 mm wide,

(b) is illuminated at all times that occupants are on the premises, and

(c) has a handrail on each side.

3.3.3. Care or Detention Occupancy

3.3.3.1. Scope

(1) This Subsection applies to *care or detention occupancies*.

3.3.3.2. Fire Separations

(1) The *fire separation* required by Sentence 3.3.5.5.(1) between a *care or detention occupancy* and a *repair garage* shall have no openings.

(2) Except as permitted by Sentence (4), in a Group B, Division 3 *occupancy*, walls between sleeping rooms and adjacent rooms shall be constructed as *fire separations* having a *fire-resistance rating* not less than 1 h, except that the *fire-resistance rating* need not be more than 45 min where the floor assembly is not required to be more than 45 min.

(3) Except as permitted by Sentence (4), in a Group B, Division 3 *occupancy*, walls separating corridors serving sleeping rooms from adjacent rooms shall be constructed as *fire separations* having a *fire-resistance rating* not less than 1 h, except that the *fire-resistance rating* need not be more than 45 min where the floor assembly is not required to be more than 45 min.

(4) In a Group B, Division 3 *occupancy* that contains sleeping accommodation for not more than 10 persons and not more than 6 occupants require assistance in evacuation in case of an emergency, the walls separating sleeping rooms from adjacent rooms and corridors shall be constructed as *fire separations* but are not required to have a *fire-resistance* rating.

(5) The door in the *fire-separation* required in Sentence (4) is permitted to be equipped with a roller latch and need to be provided with a self-closing device.

3.3.3.3. Corridors

(1) A corridor used by the public or serving patients or residents shall have no dead-end portion unless the area served by the dead-end portion has a second and separate *means of egress*.

(2) A corridor serving patients in a hospital shall be not less than 2 400 mm wide.

(3) Except as permitted in Sentence (5), a corridor serving residents who are not ambulatory in a Group B, Division 2 or 3 *occupancy* shall be not less than 1 650 mm wide.

(4) Paired doors in a corridor serving patients or residents shall,

(a) swing in opposite directions, the right hand door swinging in the direction of travel, and

(b) be not less than 1 100 mm wide.

(5) A corridor in a Group B, Division 3 *occupancy* that contains sleeping accommodation for not more than 10 persons and not more than 6 occupants require assistance in evacuation in case of an emergency need not comply with Sentence (3).

3.3.3.4. Doorway Width

(1) Except as permitted in Sentence 3.3.1.12.(12), the minimum clear width of doorways serving patients or residents shall be 1 050 mm.

3.3.3.5. Hospitals and Nursing Homes

(1) *Floor areas* containing patients' or residents' sleeping rooms in a hospital or nursing home shall conform to Sentences (2) to (12).

(2) Except as permitted by Sentence (3), a *floor area* containing patients' or residents' sleeping rooms in a hospital or nursing home shall be divided into no fewer than 2 *fire compartments*, each not more than 1 000 m^2 in area.

(3) The *floor area* on either side of a *horizontal exit* conforming to Article 3.4.6.9. is permitted to be considered as a *fire compartment* in applying the requirements of this Article.

(4) Except as permitted by Sentence (5), *fire separations* separating *fire compartments* required by Sentence (2) shall have a *fire-resistance rating* not less than 1 h.

(5) The *fire-resistance rating* of a *fire separation* referred to in Sentence (4) is permitted to be less than 1 h but not less than 45 min provided the *fire-resistance rating* required by Subsection 3.2.2. is permitted to be less than 1 h for,

(a) the floor assembly above the *floor area*, or

(b) the floor assembly below the *floor area*, if there is no floor assembly above.

(6) A *closure* in a *fire separation* between *fire compartments* referred to in Sentence (2) shall be weatherstripped or otherwise designed and installed to retard the passage of smoke.

(7) The travel distance from any point within each *fire compartment* referred to in Sentence (2) to a door to an adjoining *fire compartment* shall be not more than 45 m.

(8) Each *fire compartment* referred to in Sentence (2) shall be capable of accommodating, in addition to its own occupants, the occupants of the largest adjacent *fire compartment* based on a clear floor space of 2.5 m^2 per patient or resident in the adjacent *fire compartment*.

(9) Except as permitted by Sentences (10) and (12), walls between patients' or residents' sleeping rooms and the remainder of the *floor area* shall be constructed as *fire separations* but are not required to have a *fire-resistance rating* unless a *fire-resistance rating* is required by other provisions in this Part.

(10) The *fire separation* requirements of Sentence (9) do not apply to walls within a group of intercommunicating patients' or residents' rooms, provided the group of rooms does not

(a) contain more than 5 patients or residents, or

(b) include storage, bathing or toilet facilities serving persons not occupying the group of rooms.

(11) A door in a *fire separation* required by Sentence (9) is permitted to be equipped with a roller latch.

(12) A *fire separation* required by Sentence (9) shall not contain any grilles, louvres or other openings.

3.3.3.6. Protection for Special Care and Treatment Facilities

(1) Compartments containing rooms such as operating rooms, recovery rooms, delivery rooms, intensive care units and critical care units, from which it is impracticable to move patients in an emergency, shall be,

(a) separated from adjacent spaces by *fire separations* having a *fire-resistance rating* not less than 1 h, and

(b) provided with a mechanical air supply so that during a period of 2 h after the start of a fire in another space, the compartments will not contain more than 1% by volume of contaminated air from the fire area.

3.3.3.7. Contained Use Areas

(1) A *contained use area* shall conform to Sentences (2) to (5).

(2) A *contained use area* shall be separated from the remainder of the *building* by a *fire separation* having a *fire-resistance rating* not less than 1 h.

(3) Except as permitted by Sentence (4), a *building* that includes a *contained use area* shall be *sprinklered*.

(4) A *contained use area*, in a *building* for which Articles 3.2.2.20. to 3.2.2.83. do not require the installation of an automatic sprinkler system, is not required to be *sprinklered* as required by Sentence (3) provided,

(a) the *building* is designed so that during a period of 2 h after the start of a fire in the *contained use area*, other *fire compartments* will not contain more than 1% by volume of contaminated air from the *contained use area*,

(b) the *building* is designed so that during a period of 2 h after the start of a fire in another part of the *building*, the *contained use area* will not contain more than 1% by volume of contaminated air from the other part of the *building*,

(c) all doors are designed to be remotely released in conformance with Sentence 3.3.1.12.(6), and

(d) the *contained use area* does not contain any rooms lined with *combustible* padding.

(5) A corridor serving a *contained use area* shall have no dead-end portion unless the area served by the dead-end portion has a second and separate *means of egress*.

3.3.3.8. Handrails

(1) Corridors and ramps used by residents in a nursing home shall be equipped with handrails on each side conforming to Sentences 3.4.6.4.(3), (4), (6), (7) and (8).

3.3.4. Residential Occupancy

3.3.4.1. Scope

(1) This Subsection applies to *residential occupancies*.

3.3.4.2. Fire Separations

(1) Except as permitted by Sentences (2) and 3.2.2.9.(2), *suites* of *residential occupancy* shall be separated from each other and the remainder of the *building* by a *fire separation* having a *fire-resistance rating* not less than 1 h.

(2) The *fire-resistance rating* of the *fire separation* required by Sentence (1) is permitted to be less than 1 h but not less than 45 min provided the *fire-resistance rating* required by Subsection 3.2.2. is permitted to be less than 1 h for,

(a) the *floor assembly* above the *floor area*, or

(b) the *floor assembly* below the *floor area*, if there is no *floor assembly* above.

(3) *Floor assemblies* within a *dwelling unit* need not be constructed as *fire separations* provided,

(a) the distance between the lowest floor level and the uppermost floor level within the *dwelling unit* is not more than 6 m, and

(b) the *dwelling unit* is separated from the remainder of the *building* by a *fire separation* having a *fire-resistance rating* not less than,

  (i) 45 min if the *building* is *sprinklered* and is not more than 3 *storeys* in *building height*,

  (ii) 1 h if the *building* is *sprinklered* and is more than 3 *storeys* in *building height*

  (iii) 1 h if the *building* is not *sprinklered* and is not more than 6 *storeys* in *building height*, or

  (iv) 2 h if the *building* is not *sprinklered* and is more than 6 *storeys* in *building height*.

(4) The *fire-resistance rating* of the *fire separation* located between a *dwelling unit* and an attached *storage garage* need not conform to that required by Sentence 3.3.5.6.(1) provided,

(a) the *storage garage* contains not more than 5 vehicles,

(b) the *dwelling unit* and the attached *storage garage* are *sprinklered*,

(c) the *dwelling unit* is separated from the remainder of the *building* in conformance with Sentences (1) to (3),

(d) there are no air duct systems connecting the *storage garage* and the *dwelling unit*,

(e) the construction between the *storage garage* and the *dwelling unit* provides an effective barrier to gas and exhaust fumes, and

(f) every door between the *storage garage* and the *dwelling unit* is,

  (i) tight fitting and weather-stripped to provide an effective barrier against the passage of gas and exhaust fumes,

  (ii) fitted with a self-closing device, and

  (iii) not located in a room intended for sleeping.

(5) The *fire separation* required by Sentence 3.3.5.6.(1) is not required between a *dwelling unit* and an attached *storage garage*, serving that *dwelling unit* only, provided,

(a) the *dwelling unit* and its attached *storage garage* are separated from the remainder of the *building* in conformance with Sentences (1) to (3),

(b) there are no air duct systems connecting the *storage garage* and the *dwelling unit*,

(c) the construction between the *storage garage* and the *dwelling unit* provides an effective barrier to gas and exhaust fumes, and

(d) every door between the *storage garage* and the *dwelling unit* is,

  (i) tight fitting and weather-stripped to provide an effective barrier against the passage of gas and exhaust fumes,

  (ii) fitted with a self-closing device, and

  (iii) not located in a room intended for sleeping.

3.3.4.3. Storage Rooms

(1) Sprinklers shall be installed in a storage room provided for the use of tenants in a *residential occupancy* within a *floor area* but not contained within a *suite*.

(2) Except as permitted by Sentence (3), a storage room referred to in Sentence (1) shall be separated from the remainder of the *building* by a *fire separation* having a *fire-resistance rating* not less than 1 h.

(3) The *fire-resistance rating* of the *fire separation* required by Sentence (2) is permitted to be less than 1 h but not less than 45 min provided the *fire-resistance rating* required by Subsection 3.2.2. is permitted to be less than 1 h for,

(a) the floor assembly above the *floor area*, or

(b) the floor assembly below the *floor area*, if there is no floor assembly above.

3.3.4.4. Egress from Dwelling Units

(1) Single *storey dwelling units* in an apartment *building* need not lead to a *public corridor* or exterior passageway on the same *storey* provided the *dwelling units* are served by private stairways leading directly to a public *access to exit* on the *storey*,

(a) immediately above, and

(b) immediately below.

(2) Except as permitted by Sentences (3) to (5), a *dwelling unit* containing more than one *storey* shall have an *exit* door or an egress door opening directly into a public *access to exit* from the uppermost *storey* and from the lowest *storey* of the *dwelling unit* so that each *storey* is served by an *exit* or egress door located not more than 1 500 mm above or below its floor level.

(3) A single *exit* is permitted from a *dwelling unit* provided the *exit* is an exterior doorway not more than 1 500 mm above adjacent ground level and,

(a) it is not necessary to travel up or down more than one *storey* to reach the *exit* door, or

(b) the uppermost floor level opens to a balcony not more than 6 m above adjacent ground level.

(4) An egress door from either the uppermost *storey* or the lowest *storey* in a *dwelling unit*, as required in Sentence (2), need not be provided,

(a) if that *storey* is served by a stairway that,

  (i) leads to a public *access to exit*,

  (ii) has no direct access to any other *storey* in the *dwelling unit*, and

  (iii) is separated from the other *storeys* in the *dwelling unit* by a *fire separation* having a *fire-resistance rating* of not less than 45 min,

(b) if the *dwelling unit* has not more than 2 *storeys* above the *first storey* of the *building*, or

(c) if it is not necessary to travel either more than 18 m, or more than 1 *storey* up or down to reach the egress door.

(5) An egress door from either the uppermost *storey* or the lowest *storey* in a *dwelling unit*, as required in Sentence (2), need not be provided,

(a) on the uppermost *storey* of a *dwelling unit* having not more than 2 *storeys* above the *first storey* of the *building*,

(b) on each *storey* from which it is not necessary to travel either more than 18 m or more than 1 *storey* up or down within the *dwelling unit* to reach an egress door, or

(c) where that *storey* is,

  (i) provided with a balcony conforming to Sentence (8),

  (ii) not more than 2 *storeys* above or below the *dwelling unit* egress door, and

(iii) in a *building* that is not more than 6 *storeys* in *building height*.

(6) In a *building* of *residential occupancy* not more than 3 *storeys* in *building height*, a doorway from a *dwelling unit* is permitted to open directly into an *exit* stairway provided the *dwelling unit* has a second and separate *means of egress*.

(7) If a *dwelling unit* has a second and separate *means of egress*, one *means of egress* from a *dwelling unit* is permitted to pass through,

(a) an interior corridor served by a single *exit*,

(b) an exterior balcony served by a single *exit* stairway, or

(c) an exterior passageway served by a single *exit* stairway.

(8) Where a balcony is provided to meet the requirements of Sentence (3) or (5), the balcony shall have,

(a) a solid floor having a *fire-resistance rating* not less than that required for a floor assembly between *suites*, and

(b) an area providing not less than 1.5 m^2 per *suite* occupant, based on *occupant load*, and a minimum dimension of 1 200 mm.

3.3.4.5. Automatic Locking Prohibition

(1) Except for *hotels*, a door opening onto a *public corridor* that provides *access to exit* from a *suite* shall be designed not to lock automatically.

3.3.4.6. Sound Transmission

(1) Sound transmission class ratings of *building* assemblies shall conform to Section 5.9.

3.3.4.7. Stairs, Handrails and Guards for Dwelling Units

(1) Stairs, handrails and *guards* within a *dwelling unit* shall conform to the appropriate requirements in Section 9.8.

3.3.5. Industrial Occupancy

3.3.5.1. Scope

(1) This Subsection applies to *industrial occupancies*.

3.3.5.2. Fire Extinguishing Systems

(1) In addition to other requirements in this Division for the installation of automatic fire extinguishing systems, an appropriate fire extinguishing system shall be installed in every *industrial occupancy floor area* to provide protection if required by,

(a) the Fire Code made under the *Fire Protection and Prevention Act, 1997*, or

(b) the National Fire Code of Canada, in the absence of provisions referred to in Clause (a).

3.3.5.3. Basements

(1) A *basement* shall not be used for the storage, manufacture or handling of volatile solids, liquids or gases that generate explosive air-vapour mixtures or for processes that involve explosive dusts.

(2) Entrances and *exits* to a *basement* and to rooms containing *building* services shall be separate from the remainder of the *building* in a *building* in which,

(a) the storage, manufacture or handling of volatile materials can generate explosive air-vapour mixtures, or

(b) processes occur that produce explosive dusts.

(3) *Basements* and rooms referred to in Sentence (2) shall be separated from the remainder of the *building* with a vapour-tight separation.

3.3.5.4. Repair and Storage Garages

(1) If access is provided from a *storage garage* to a stair tower or elevator serving *occupancies* above the level of the *storage garage*, the access shall be through a vestibule conforming to Sentence 3.3.5.7.(3).

(2) Treads and landings in interior stairs that extend to the roof of a *storage garage* shall be designed to be free of accumulations of ice and snow.

(3) A mechanical *storage garage* not more than 4 *storeys* in *building height*, in which no persons other than parking attendants are permitted above the *street* floor level, need not have a *fire separation* between the *exits* and the remainder of the *building*.

(4) A garage shall be provided with natural or mechanical ventilation in conformance with the requirements of Subsection 6.2.2. to prevent excessive accumulation of carbon monoxide, exhaust fumes or flammable and toxic vapours.

(5) Except as required by Sentence 3.8.2.2.(2), the clear height in a *storage garage* shall be not less than 2000 mm.

(6) A continuous curb not less than 150 mm high and a *guard* not less than 1 070 mm high shall be provided at every garage floor opening and around the perimeter of every floor where the exterior walls are omitted.

(7) Except for *open-air storeys*, every *storey* of a *storage garage* or *repair garage* located below *grade* shall be *sprinklered*.

3.3.5.5. Repair Garage Separation

(1) A *repair garage* and any ancillary spaces serving it, including waiting rooms, reception rooms, tool and parts storage areas and supervisory office space, shall be separated from other *occupancies* by a *fire separation* having a *fire-resistance rating* not less than 2 h.

3.3.5.6. Storage Garage Separation

(1) Except as permitted by Sentences 3.3.4.2.(4) and (5), a *storage garage* shall be separated from other *occupancies* by a *fire separation* with a *fire-resistance rating* not less than 1.5 h.

3.3.5.7. Vestibules

(1) If access is provided through a *fire separation* between a *storage garage* and a Group A, Division 1 or Group B *occupancy*, the access shall be through a vestibule conforming to Sentence (3).

(2) In a *building* more than 3 *storeys* in *building height*, access through a *fire separation* between a *storage garage* and a Group A, Division 2, 3 or 4, or a Group C *occupancy*, shall be through a vestibule conforming to Sentence (3).

(3) If access is provided through a vestibule, as required by Sentences (1), (2) and 3.3.5.4.(1), the vestibule shall,

(a) be not less than 1 800 mm long,

(b) be ventilated,

 (i) naturally to outside air by a vent that has an unobstructed area of not less than 0.1 m^2 for each door that opens into the vestibule but not less than 0.4 m^2, or

 (ii) mechanically at a rate of 14 m^3/h for each square metre of vestibule floor surface area, and

(c) have openings between the vestibule and an adjoining *occupancy* provided with self-closing doors with no hold-open devices.

3.3.5.8. Toe-Boards Required

(1) Where tools or other objects could fall from the floor of an upper level to a lower level in a room or space intended for use as a Group F *occupancy*, the edge of the floor at the upper level shall be provided with a toe-board extending from the floor surface to a height at least 125 mm above the floor surface.

Section 3.4. Exits

3.4.1. General

3.4.1.1. Scope

(1) *Exit* facilities complying with this Section shall be provided from every *floor area* that is intended for *occupancy*.

3.4.1.2. Separation of Exits

(1) Except as permitted by Sentence (2), if more than one *exit* is required from a *floor area*, each *exit* shall be separate from every other *exit* leading from that *floor area*.

(2) If more than 2 *exits* are provided from a *floor area*, *exits* are permitted to converge in conformance with Sentence 3.4.3.1.(2), provided the cumulative capacity of the converging *exits* does not contribute more than 50% of the total required *exit* width for the *floor area*.

3.4.1.3. Access to Exits

(1) *Access to exits* shall conform to Section 3.3.

3.4.1.4. Types of Exit

(1) Subject to the requirements of this Section, an *exit* from any *floor area* shall be one of the following, used singly or in combination:

(a) an exterior doorway,

(b) an exterior passageway,

(c) an exterior ramp,

(d) an exterior stairway,

(e) a fire escape (conforming to Subsection 3.4.7.),

(f) a *horizontal exit*,

(g) an interior passageway,

(h) an interior ramp, or

(i) an interior stairway.

3.4.1.5. Exterior Exit Passageways

(1) Access to an exterior *exit* passageway from a *floor area* shall be through *exit* doors at the floor level.

(2) Every exterior *exit* passageway that has a drop of more than 500 mm on any side shall have *guards* on the open sides not less than 1 070 mm high.

3.4.1.6. Restricted Use of Horizontal Exits

(1) Except as permitted by Sentence (2), *horizontal exits* shall not comprise more than one half of the required number of *exits* from any *floor area*.

(2) In a hospital or nursing home, *horizontal exits* serving patients' or residents' sleeping rooms shall comprise not more than two thirds of the required number of *exits* from any *floor area*.

(3) Where an elementary or secondary school is subdivided by a *firewall*, a *horizontal exit* shall not serve as an *exit* but is permitted to serve as an *access to exit*.

3.4.1.7. Slide Escapes

(1) A slide escape shall not be erected on any *building* as a required *exit*, but is permitted to be provided as an additional egress facility if unusual hazards are foreseen.

3.4.1.8. Transparent Doors and Panels

(1) Glass and transparent panels in an *exit* shall conform to the appropriate requirements of Article 3.3.1.18. for glass and transparent panels in an *access to exit*.

3.4.1.9. Mirrors near Exits

(1) No mirror shall be placed in or adjacent to any *exit* in a manner that would confuse the direction of *exit*.

3.4.1.10. Combustible Glazing in Exits

(1) *Combustible* glazing is not permitted in wall or ceiling assemblies or in *closures* used to *construct* an *exit* enclosure.

3.4.1.11. Exterior Stairway for Nursing Home

(1) No open exterior stairway shall serve as a *means of egress* for residents above the second floor of a nursing home.

3.4.2. Number and Location of Exits from Floor Areas

3.4.2.1. Minimum Number of Exits

(1) Except as permitted by Sentences (2) to (4) and (6), every *floor area* intended for *occupancy* shall be served by at least 2 *exits*.

(2) A *floor area* in a *building* not more than 2 *storeys* in *building height*, is permitted to be served by one *exit* provided the total *occupant load* served by the *exit* is not more than 60 and,

(a) in a *floor area* that is not *sprinklered*, the *floor area* and the travel distance are not more than the values in Table 3.4.2.1.A., or

(b) in a *floor area* that is *sprinklered*,

  (i) the travel distance is not more than 25 m, and

  (ii) the *floor area* is not more than the value in Table 3.4.2.1.B.

Table 3.4.2.1.A.
Criteria for One Exit, Floor Area not Sprinklered

Forming Part of Sentence 3.4.2.1.(2)

COLUMN 1	COLUMN 2	COLUMN 3
Occupancy of *Floor Area*	Maximum *Floor Area*, m^2	Maximum Travel Distance, m
Group A	150	15
Group C	100	15
Group D	200	25
Group E	150	15
Group F, Division 2	150	10
Group F, Division 3	200	15

(3) Except as permitted by Sentence (4), if Sentence (2) permits a single *exit* from a *floor area* classified as Group B or Group C *occupancy*, the *exit* shall be an exterior doorway not more than 1 500 mm above adjacent ground level.

Table 3.4.2.1.B.
Criteria for One Exit, Floor Area Sprinklered

Forming Part of Sentence 3.4.2.1.(2)

COLUMN 1	COLUMN 2
Occupancy of *Floor Area*	Maximum *Floor Area*, m^2
Group A	200
Group B	100
Group C	150
Group D	300
Group E	200
Group F, Division 2	200
Group F, Division 3	300

(4) The requirements of Sentences (1) and (2) are permitted to be waived for *dwelling units* having *access to exit* conforming to Sentences 3.3.4.4.(1) to (4).

(5) *Exits* are not required directly from rooftop enclosures that are provided with *access to exits* in conformance with Sentences 3.3.1.3.(5) and (6).

(6) Every room containing an *assembly occupancy* serving a *hotel*, and located in the *building* containing the *hotel*, shall be provided with no fewer than,

(a) 3 separate egress doorways from the room where the *occupant load* is more than 600 persons, and

(b) 4 separate egress doorways from the room where the *occupant load* is more than 1000 persons.

(7) Each egress doorway in Sentence (6) shall be considered as contributing not more than,

(a) one third of the required width where 3 egress doorways are required, and

(b) one fourth of the required width where 4 egress doorways are required.

3.4.2.2. Mezzanine Exiting

(1) Except as permitted by Sentences (2) to (4), a *mezzanine* shall be provided with *exits* on the same basis as required for *floor areas* by this Section.

(2) A *mezzanine* need not conform to Sentence (1) provided Article 3.2.8.1. does not require it to terminate at a vertical *fire separation*.

(3) In a *floor area* that is not *sprinklered*, a *mezzanine* need not conform to Sentence (1) where Article 3.2.8.1. does require it to terminate at a vertical *fire separation* provided the total *occupant load* of the *mezzanine* is not more than 60 and,

(a) the area of the *mezzanine* does not exceed the area limits for rooms and *suites* in Table 3.3.1.5.A., and

(b) the distance limits in Table 3.3.1.5.A. are not exceeded from any point on the *mezzanine* to,

  (i) the egress doorway from the room in which the *mezzanine* is located if that room has a single egress doorway, or

  (ii) an egress facility leading from the *mezzanine* if the room in which the *mezzanine* is located has 2 egress doorways provided in conformance with Subsection 3.3.1.

(4) In a *floor area* that is *sprinklered*, a *mezzanine* need not conform to Sentence (1) where Article 3.2.8.1. does require it to terminate at a vertical *fire separation* provided the total *occupant load* of the *mezzanine* is not more than 60 and,

(a) the area of the *mezzanine* does not exceed the area limits for rooms and *suites* in Table 3.3.1.5.B., and

(b) the distance of travel is not more than 25 m when measured from any point on the *mezzanine* to,

  (i) the egress doorway from the room in which the *mezzanine* is located if that room has a single egress doorway, or

  (ii) an egress facility leading from the *mezzanine* if the room in which the *mezzanine* is located has 2 egress doorways provided in conformance with Subsection 3.3.1.

3.4.2.3. Distance between Exits

(1) Except as provided in Sentence (2), the least distance between 2 required *exits* from a *floor area* shall be,

(a) one half the maximum diagonal dimension of the *floor area*, but need not be more than 9 m for a *floor area* having a *public corridor*, or

(b) one half the maximum diagonal dimension of the *floor area*, but not less than 9 m for all other *floor areas*.

(2) *Exits* need not comply with Sentence (1) where,

(a) the *floor area* is divided so that not less than one third of the *floor area* is on each side of the *fire separation*, and

(b) it is necessary to pass through the *fire separation* to travel from one *exit* to another *exit*.

(3) The minimum distance between *exits* referred to in Sentence (1) shall be the shortest distance that smoke would have to travel between the *exits*, assuming that the smoke will not penetrate an intervening *fire separation*.

3.4.2.4. Travel Distance

(1) Except as permitted by Sentence (2), for the purposes of this Subsection, travel distance means the distance from any point in the *floor area* to an *exit* measured along the path of travel to the *exit*.

(2) The travel distance from a *suite* or a room not within a *suite* is permitted to be measured from an egress door of the *suite* or room to the nearest *exit* provided,

(a) the *suite* or room is separated from the remainder of the *floor area* by a *fire separation*,

  (i) having a *fire-resistance rating* not less than 45 min in a *floor area* that is not *sprinklered*, or

  (ii) that is not required to have a *fire-resistance rating*, in a *floor area* that is *sprinklered*, and

(b) the egress door opens onto,

  (i) an exterior passageway,

  (ii) a corridor used by the public that is separated from the remainder of the *floor area* in conformance with the requirements in Article 3.3.1.4. for the separation of *public corridors*, or

  (iii) a *public corridor* that is separated from the remainder of the *floor area* in conformance with Article 3.3.1.4.

(3) Travel distance to an *exit* shall be not more than 50 m from any point in a *service space* referred to in Sentence 3.2.1.1.(9).

(4) If there is a *firewall* in an elementary or secondary school, the travel distance shall not be measured to a door in the *firewall*, but shall be measured to an exterior *exit* door or an *exit* door to a stairway.

3.4.2.5. Location of Exits

(1) Except as permitted by Sentences (2), 3.2.8.4.(4) and 3.3.2.4.(13) to (16), if more than one *exit* is required from a *floor area*, the *exits* shall be located so that the travel distance to at least one *exit* shall be not more than,

(a) 25 m in a *high hazard industrial occupancy*,

(b) 40 m in a *business and personal services occupancy*,

(c) 45 m in a *floor area* that contains an *occupancy* other than a *high hazard industrial occupancy*, provided it is *sprinklered*,

(d) 105 m in any *floor area*, served by a *public corridor*, in which rooms and *suites* are not separated from the remainder of the *floor area* by a *fire separation*, provided,

  (i) the *public corridor* is not less than 9 m wide,

  (ii) the ceiling height in the *public corridor* is not less than 4 m above all floor surfaces,

  (iii) the *building* is *sprinklered*, and

  (iv) not more than one half of the required egress doorways from a room or *suite* open into the *public corridor* if the room or *suite* is required to have more than one egress doorway,

(e) 60 m in any *storage garage* that conforms to the requirements of Article 3.2.2.83., and

(f) 30 m in any *floor area* other than those referred to in Clauses (a) to (e).

(2) Except for a *high hazard industrial occupancy*, Sentence (1) need not apply if *exits* are placed along the perimeter of the *floor area* and are not more than 60 m apart, measured along the perimeter, provided each main aisle in the *floor area* leads directly to an *exit*.

(3) *Exits* shall be located and arranged so that they are clearly visible or their locations are clearly indicated and they are accessible at all times.

3.4.2.6. Principal Entrance

(1) For the purposes of this Section, at least one door at every principal entrance from ground level shall be designed in accordance with the requirements for *exits*.

3.4.3. Width and Height of Exits

3.4.3.1. Exit Width Based on Occupant Load

(1) For the purpose of determining the aggregate width of *exits*, the *occupant load* of every room or *floor area* shall be determined in conformance with Subsection 3.1.17.

(2) Except as permitted by Sentence 3.4.3.2.(4), the required *exit* width shall be cumulative if 2 or more *exits* converge.

3.4.3.2. Exit Width

(1) Except as permitted by Sentence (3), the minimum aggregate required width of *exits* serving *floor areas* intended for *assembly occupancies*, *residential occupancies*, *business and personal services occupancies*, *mercantile occupancies*, and *industrial occupancies* shall be determined by multiplying the *occupant load* of the area served by,

(a) 6.1 mm per person for ramps with a slope of not more than 1 in 8, doorways, corridors and passageways,

(b) 8 mm per person for a stair consisting of steps whose rise is not more than 180 mm and whose run is not less than 280 mm, or

(c) 9.2 mm per person for,

  (i) ramps with a slope of more than 1 in 8, or

  (ii) stairs, other than stairs conforming to Clause (b).

(2) The minimum aggregate width of *exits* serving *floor areas* intended for a *care or detention occupancy* shall be determined by multiplying the *occupant load* of the area served by 18.4 mm per person.

(3) The minimum aggregate width of *means of egress* serving a Group A, Division 4 *occupancy* shall be determined by multiplying the *occupant load* of the area served by,

(a) 1.8 mm per person for

  (i) aisles,

  (ii) stairs other than *exit* stairs, and

  (iii) ramps and passageways in vomitories and *exits*, and

(b) 2.4 mm per person for *exit* stairs.

(4) Except as required by Sentence (5) and the required *exit* width need not be cumulative in an *exit* serving 2 or more *floor areas* located one above the other.

(5) The required *exit* width for an *exit* stair in an assembly hall or *theatre* serving more than one balcony level shall conform to the appropriate requirements for stairs serving *interconnected floor spaces* in Article 3.2.8.4.

(6) If more than one *exit* is required, every *exit* shall be considered as contributing not more than one half of the required *exit* width.

(7) The width of an *exit* shall be not less than,

(a) 1 100 mm for corridors and passageways,

(b) 1 100 mm for ramps not serving patients' or residents' sleeping rooms,

(c) 1 100 mm for stairs, not serving patients' or residents' sleeping rooms, that serve more than two *storeys* above the lowest *exit level* or more than one *storey* below the lowest *exit level*,

(d) 900 mm for stairs, not serving patients' or residents' sleeping rooms, that serve not more than two *storeys* above the lowest *exit level* or not more than one *storey* below the lowest *exit level*,

(e) 1650 mm for stairs and ramps serving patients' or residents' sleeping rooms,

(f) 1 050 mm for doorways serving patients' or residents' sleeping rooms, and

(g) 790 mm for doorways not serving patients' or residents' sleeping rooms.

3.4.3.3. Exits from Interconnected Floor Space

(1) *Exit* stairs that serve *interconnected floor spaces* as provided in Articles 3.2.8.3. to 3.2.8.11. shall conform to the requirements in Article 3.2.8.4. and in this Section.

3.4.3.4. Exit Width Reduction

(1) Except as permitted by Sentences (2) to (4), no fixture, turnstile or construction shall project into or be fixed within the required width of an *exit*.

(2) *Exit* doors shall be hung so that, when open, they shall neither diminish nor obstruct the required width of the *exit* by more than 50 mm for each door leaf.

(3) Swinging doors in their swing shall not reduce the required width of *exit* stairs or landings to less than 750 mm or reduce the width of an *exit* passageway to less than the minimum required width.

(4) Handrails and construction below handrails are permitted to project into the required width of *means of egress* but the projections shall be not more than 100 mm on each side of the required width.

(5) In an elementary or secondary school, where a stair lift is installed in an *exit* stair, an intermediate handrail shall be installed between the path of travel of the stair lift and the remainder of the stair to ensure that the stair lift will not reduce the required width of the *exit* stair.

3.4.3.5. Headroom Clearance

(1) Except as permitted by Sentences (2) to (4), every *exit* shall have a headroom clearance of not less than 2 100 mm.

(2) The headroom clearance for stairways measured vertically above any landing or the nosing of any stair tread shall be not less than 2 050 mm.

(3) Except as permitted by Sentence (4), the headroom clearance for doorways shall be not less than 2 030 mm.

(4) No door closer or other device shall be installed so as to reduce the headroom clearance of a doorway to less than 1 980 mm.

3.4.4. Fire Separation of Exits

3.4.4.1. Fire-Resistance Rating of Exit Separations

(1) Except as permitted by Sentences (2), (4), 3.3.5.4.(3), 3.4.4.2.(2), 3.4.4.3.(1) and 3.13.3.1.(3), every *exit* shall be separated from the remainder of the *building* by a *fire separation* having a *fire-resistance rating* not less than that required by Subsection 3.2.2., but not less than 45 min, for,

(a) the floor assembly above the *storey*, or

(b) the floor assembly below the *storey*, if there is no floor assembly above.

(2) The *fire-resistance rating* of the *fire separation* referred to in Sentence (1) need not be more than 2 h.

(3) If an *exit* stair in an assembly hall or *theatre* serves more than one balcony level, the *exit* stair shall be separated from the remainder of the *building* in conformance with Sentence (1).

(4) The path of *exit* travel may lead from an *exit* door or *exit* enclosure through *open air* parking that is located below a roof or floor assembly that is part of the *building* served by the *exit* door or *exit* enclosure where,

(a) the portion of the path of *exit* travel that leads through the *open air* parking is not more than 9 m in length measured from the *exit* door to a point at ground level at the perimeter of the *building*,

(b) measures are taken to prevent vehicles intended to park in spaces adjacent to the path of *exit* travel from encroaching on the path of *exit* travel, and

(c) an alternate *means of egress* not leading through the *open air* parking is available from the interior side of the door opening onto the path of *exit* travel through the *open air* parking area.

3.4.4.2. Exits through Lobbies

(1) Except as permitted by Sentence (2), no *exit* from a *floor area* above or below the *first storey* shall lead through a lobby.

(2) Not more than one *exit* from a *floor area* is permitted to lead through a lobby provided,

(a) the lobby floor is not more than 4.5 m above *grade*,

(b) the path of travel through the lobby to the outdoors is not more than 15 m,

(c) the adjacent rooms or premises having direct access to the lobby do not contain a *residential occupancy* or an *industrial occupancy*, except that *dwelling units* may open directly onto the lobby where,

  (i) from the interior of the *exit* stair that opens onto the lobby there is alternate *means of egress* not leading through the lobby and such *means of egress* is entirely within the same *storey* as the lobby, or

  (ii) the *floor area* is *sprinklered*,

(d) except as required by Clause (g), the lobby is not located within an *interconnected floor space* other than as described in Sentence 3.2.8.2.(6),

(e) the lobby conforms to the requirements for *exits*, except that,

  (i) rooms other than *service rooms* and storage rooms are permitted to open onto the lobby,

  (ii) the *fire separation* between the lobby and a room used for the sole purpose of control and supervision of the *building* need not have a *fire-resistance rating*,

  (iii) the *fire separation* between the lobby and adjacent *occupancies* that are permitted to open onto the lobby need not have a *fire-resistance rating* provided the lobby and adjacent *occupancies* are *sprinklered*, and

  (iv) passenger elevator entrances are permitted to open onto the lobby provided the elevator entrance doors are designed to remain closed except while loading and unloading,

(f) a *fire separation*, constructed in accordance with Sentence 3.4.4.1.(1), is maintained between the lobby and any *exit* permitted by this Sentence to lead through the lobby, and

(g) that if the *exit* serves a *hotel*, the lobby is not located within an *interconnected floor space*.

3.4.4.3. Exterior Passageway Exceptions

(1) The requirements of Sentences 3.4.4.1.(1) and 3.2.3.13.(1) and (3) do not apply to an exterior *exit* passageway provided,

(a) not less than 50% of the exterior side is open to the outdoors, and

(b) an *exit* stair is provided at each end of the passageway.

3.4.4.4. Integrity of Exits

(1) A *fire separation* that separates an *exit* from the remainder of the *building* shall have no openings except for,

(a) standpipe and sprinkler piping,

(b) electrical wires and cables, totally enclosed *noncombustible* raceways and *noncombustible* piping that serve only the *exit*,

(c) openings required by the provisions of Subsection 3.2.6.,

(d) *exit* doorways, and

(e) wired glass and glass block permitted by Article 3.1.8.14.

(2) *Exits* within scissors stairs and other contiguous *exit* stairways shall be separated from each other by a smoke-tight *fire separation* having a *fire-resistance rating* not less than that required for the floor assembly through which they pass.

(3) *Fire separations* separating contiguous stairs described in Sentence (2) shall not be pierced by doorways, ductwork, piping or any other openings that affect the continuity of the separation.

(4) A fuel-fired *appliance* shall not be installed in an *exit*.

(5) An *exit* shall not be used as a *plenum* for a heating, ventilating or *air-conditioning* system.

(6) An *exit* shall be designed for no purpose other than for exiting, except that an *exit* is permitted also to be designed to serve as an access to a *floor area*.

(7) A *service room* shall not open directly into an *exit*.

(8) Storage rooms, washrooms, toilet rooms, laundry rooms and similar ancillary rooms shall not open directly into an *exit*.

(9) *Service spaces* referred to in Sentence 3.2.1.1.(9) shall not open directly into an *exit*.

(10) In elementary and secondary schools, an *exit* shall be designed so that it does not serve as an access from one portion of a *floor area* to another portion of the same *floor area*.

3.4.5. Exit Signs

3.4.5.1. Exit Signage

(1) Except as required by Sentences (7) and (9), every *exit* door shall have an *exit* sign placed over or adjacent to it if the *exit* serves,

(a) a *building* more than 2 *storeys* in *building height*,

(b) a *building* having an *occupant load* more than 150, or

(c) a room or *floor area* that has a fire escape as part of a required *means of egress*.

(2) Except as provided in Sentence (8), every *exit* sign shall,

(a) be visible from the *exit* approach,

(b) have the word EXIT or the words EXIT/SORTIE displayed in plain legible letters, and

(c) be illuminated continuously while the *building* is occupied.

(3) *Exit* signs shall consist of red letters on a contrasting background or a red background with contrasting letters, with the letters having a 19 mm stroke and a height not less than,

(a) 114 mm when internally illuminated, and

(b) 150 mm when externally illuminated.

(4) If illumination of an *exit* sign is provided from an electrical circuit, that circuit shall,

(a) serve no equipment other than emergency equipment, and

(b) be connected to an emergency power supply as described in Sentence 3.2.7.4.(1)

(5) If necessary, the direction of egress in *public corridors* and passageways shall be indicated by a sign conforming to Sentences (2) to (4) with a suitable arrow or pointer indicating the direction of egress.

(6) Except for egress doorways described in Sentence 3.3.2.3.(4), an *exit* sign conforming to Sentences (2) to (4) shall be placed over or adjacent to every egress doorway from rooms with an *occupant load* more than 60 in Group A, Division 1 *occupancies*, dance halls, licensed beverage establishments and other similar *occupancies* that, when occupied, have lighting levels below the level that would provide easy identification of the egress doorway.

(7) Except for *suite* doors opening directly to the exterior, every *exit* serving a *hotel* shall have an *exit* sign placed over or adjacent to it.

(8) If an *exit* sign having the word EXIT is installed in conformance with this Article, an additional sign displaying the word SORTIE is permitted to be installed.

(9) An *exit* sign is not required within a *suite* containing a Group B, Division 3 *occupancy* that contains sleeping accommodation for not more than 10 persons and not more than 6 occupants require assistance in evacuation in case of an emergency.

3.4.5.2. Signs within Exit Facilities

(1) In a *building* more than 2 *storeys* in *building height*, any part of an *exit* ramp or stair that continues up or down past the lowest *exit level* shall be clearly marked by a sign indicating that it does not lead to an *exit*.

(2) An *exit* stair serving a *building* more than 6 *storeys* in *building height* shall be clearly marked by signs indicating that it does not lead to an *exit* at the roof level.

3.4.6. Types of Exit Facilities

3.4.6.1. Slip Resistance of Ramps and Stairs

(1) The surfaces of ramps, landings and treads,

(a) shall have a finish that is slip resistant, and

(b) if accessible to the public, shall have either a colour contrast or a distinctive pattern to demarcate the leading edge of the tread and the leading edge of the landing, as well as the beginning and end of a ramp.

(2) Treads and landings of exterior *exit* stairs shall be designed to be free of ice and snow accumulations if the stairs,

(a) are more than 10 m high, or

(b) serve a *hotel*.

3.4.6.2. Minimum Number of Risers

(1) Except as permitted by Sentence 3.3.2.13.(1), every flight of interior stairs shall have no fewer than 3 risers.

3.4.6.3. Landings and Maximum Vertical Rise of Stair Flights

(1) No flight of stairs shall have a vertical rise of more than 3.7 m between floors or landings, except that a flight of stairs serving as an *exit* in a Group B, Division 2 or 3 *occupancy* shall have a vertical rise not more than 2 400 mm between floors or landings.

(2) Except as provided in Sentence (6), the length and width of a landing shall be at least the width of the stairway in which it occurs, except that in a straight run the length of the landing need not be more than 1 100 mm.

(3) Where a doorway or stairway empties onto a ramp through a side wall, there shall be a level area extending across the full width of the ramp, and for a distance of 300 mm on either side of the wall opening, or on one side if the opening abuts on an end wall.

(4) Where a doorway or stairway empties onto a ramp through an end wall, there shall be a level area extending across the full width of the ramp and along its length for not less than 900 mm.

(5) A landing shall be provided at the top and bottom of every flight of stairs or section of a ramp.

(6) Where the direction of *exit* travel changes at a landing, the landing is permitted to be chamfered or curved in plan, provided the required width of the stair is maintained where measured perpendicular to the direction of *exit* travel across the landing.

3.4.6.4. Handrails

(1) A ramp or stairway shall have a handrail on at least one side, and if 1 100 mm or more in width, shall have handrails on both sides.

(2) If the required width of a ramp or flight of stairs is more than 2 200 mm, one or more intermediate handrails continuous between landings shall be provided, and located so that there will be not more than 1 650 mm between handrails.

(3) Handrails shall be continuously graspable along their entire length and shall have,

(a) a circular cross-section with an outside diameter not less than 30 mm and not more than 43 mm, or

(b) any non-circular shape with a graspable portion that has a perimeter not less than 100 mm and not more than 125 mm and whose largest cross-sectional dimension is not more than 45 mm.

(4) Handrails on stairs and ramps shall be not less than 865 mm and not more than 965 mm high, measured vertically from a line drawn through the outside edges of the stair nosing or from the surface of the ramp, except that handrails not meeting these requirements are permitted provided they are installed in addition to the required handrail.

(5) Except as required by Sentence (11) and except where interrupted by doorways or newels at changes in direction, at least one handrail shall be continuous throughout the length of a stairway or ramp, including landings.

(6) Handrails shall be terminated in a manner that will not obstruct pedestrian travel or create a hazard.

(7) At least one handrail shall,

(a) in the case of a stair,

  (i) extend horizontally at the required height, not less than 300 mm beyond the top riser, and

  (ii) continue to slope for a depth of one tread beyond the bottom riser followed by a 300 mm horizontal extension, and

(b) in the case of a ramp, extend horizontally at the required height, not less than 300 mm beyond the top and bottom edges of the incline.

(8) The clearance between a handrail and any surface behind it shall be not less than 50 mm.

(9) Handrails and their supports shall be designed and constructed to withstand the loading values obtained from the nonconcurrent application of,

(a) a concentrated load not less than 0.9 kN applied at any point and in any direction for all handrails, and

(b) a uniform load not less than 0.7 kN/m applied in any direction to handrails not located within *dwelling units*.

(10) A ramp shall have handrails on both sides.

(11) In a nursing home, a home for the aged and a Group B, Division 3 *occupancy*, a continuous handrail shall be provided on both sides of a stairway throughout the length of the stairway, including landings, except where a handrail is interrupted by doorways or newels at changes in direction.

3.4.6.5. Guards

(1) Every *exit* shall have a wall or a well-secured *guard* on each side.

(2) Except as required by Sentence (4), the height of *guards* for *exit* stairs shall be not less than 920 mm measured vertically to the top of the *guard* from a line drawn through the outside edges of the stair nosings and 1 070 mm around landings.

(3) *Exit* ramps and their landings shall be protected with *guards* not less than 1 070 mm measured vertically to the top of the *guard* from the ramp surface where the difference in elevation between the adjacent ground or floor level and the ramp is more than 600 mm.

(4) The height of *guards* for exterior stairs and landings more than 10 m above adjacent ground level shall be not less than 1 500 mm measured vertically to the top of the *guard* from the surface of the landing or a line drawn through the outside edges of the stair nosings.

(5) Except as provided in Sentence (6), openings through any *guard* that is required by Sentence (1) shall be of a size that will prevent the passage of a sphere having a diameter more than 100 mm unless it can be shown that the location and size of openings that exceed this limit do not represent a hazard.

(6) Openings through any *guard* that is required by Sentence (1) and that is installed in a *building* of *industrial occupancy* shall be of a size that will prevent the passage of a sphere having a diameter more than 200 mm unless it can be shown that the location and size of openings that exceed this limit do not represent a hazard.

(7) In a stairway, a window for which the distance measured vertically between the bottom of the window and a line drawn through the outside edges of the stair nosings is less than 900 mm, or a window that extends to less than 1 070 mm above the landing, shall,

(a) be protected by a *guard* that is,

  (i) located approximately 900 mm above a line drawn through the outside edges of the stair nosings, or

  (ii) not less than 1 070 mm high measured to the top of the *guard* from the surface of the landing, or

(b) be fixed in position and designed to resist the lateral design loads specified for *guards* and walls in Articles 4.1.5.15. and 4.1.5.17.

(8) Unless it can be shown that the location and size of openings do not present a hazard, a *guard* shall be designed so that no member, attachment or opening located between 140 mm and 900 mm above the level being protected by the *guard* will facilitate climbing.

3.4.6.6. Ramp Slope

(1) Except as required for aisles by Article 3.3.2.4., the maximum slope of a ramp shall be,

(a) 1 in 10 in any *assembly occupancy*, *care or detention occupancy* or *residential occupancy*,

(b) 1 in 6 in rooms or *floor areas* classified as *mercantile occupancy* or *industrial occupancy*,

(c) 1 in 8 in any other *floor area*, and

(d) 1 in 10 for an exterior ramp.

3.4.6.7. Treads and Risers

(1) Except as permitted for *dwelling units* and by Sentence 3.4.7.5.(1) for fire escapes, steps for stairs shall have a run of not less than 255 mm and not more than 355 mm between successive steps.

(2) Steps for stairs referred to in Sentence (1) shall have a rise between successive treads not less than 125 mm and not more than 200 mm.

(3) Treads and risers in every *exit* stair, except a fire escape stair, shall have uniform run and rise in any one flight, and shall not alter significantly in run and rise in successive flights in any stair system.

(4) Except as permitted by Sentence (6), the leading edge of a stair tread shall have either a radius or a bevel between 6 mm and 10 mm in horizontal dimension.

(5) The front edge of stair treads in *exits* and public *access to exits* shall be at right angles to the direction of *exit* travel.

(6) If resilient material is used to cover the leading edge of a stair tread, the minimum radius or bevel required by Sentence (4) is permitted to be reduced to 3 mm.

3.4.6.8. Curved Stairs

(1) Except as permitted by Sentence (2), tapered treads shall not be used in an *exit*.

(2) A curved stair used as an *exit* shall have,

(a) a handrail on each side,

(b) treads with a minimum run of 240 mm exclusive of nosings,

(c) treads that conform to Article 3.4.6.7. where they are measured 230 mm away from the handrail at the narrow end of the tread, and

(d) an inside radius that is not less than twice the stair width.

3.4.6.9. Horizontal Exits

(1) Except in an elementary or secondary school that is subdivided by a *firewall*, the *floor area* on each side of a *horizontal exit* shall be sufficient to accommodate the occupants of both *floor areas*, allowing not less than 0.5 m^2 of clear floor space per person, except that 1.5 m^2 shall be provided for each person in a wheelchair and 2.5 m^2 for each patient in bed.

(2) If vestibules, enclosed balconies or bridges are used as parts of a *horizontal exit*, their clear width shall be not less than that of the *exit* doorways opening into them, except that handrails are not permitted to project into this clear width more than 100 mm.

(3) In a *horizontal exit* where there is a difference in level between the connected *floor areas*, slopes not more than those specified for ramps in Article 3.4.6.6. are permitted to be used.

(4) No stairs or steps shall be used at a *horizontal exit*.

(5) If 2 doors are provided in a *horizontal exit* that comprises a part of the required number of *exits* from the *floor areas* on both sides of the *exit*,

(a) the doors shall be mounted adjacent to each other with the door on the right side in the direction of travel through the *horizontal exit* swinging in the direction of travel through the *horizontal exit*, and

(b) signs shall be provided on each side of the *horizontal exit* to indicate the door that swings in the direction of travel from that side.

(6) If a *horizontal exit* utilizes bridges between *buildings* or outside balconies, the bridges or balconies shall conform to Article 3.2.3.19.

(7) Any change in floor level from one side of a *horizontal exit* to the other side shall not exceed 2 000 mm.

3.4.6.10. Doors

(1) The distance between a stair riser and the leading edge of a door during its swing shall be not less than 300 mm.

(2) No *exit* door shall open directly onto a step except that, if there is danger of blockage from ice or snow, an *exit* door is permitted to open onto not more than one step which shall be not more than 150 mm high.

(3) *Exit* doors shall be clearly identifiable

(4) No door leaf in an *exit* doorway with more than one leaf shall be less than 600 mm wide.

3.4.6.11. Direction of Door Swing

(1) Except as permitted by Sentences (2), (3) and Article 3.4.6.13., every *exit* door shall,

(a) open in the direction of *exit* travel, and

(b) swing on its vertical axis.

(2) A door serving a single *dwelling unit* shall swing on its vertical axis.

(3) Except in a *high hazard industrial occupancy*, an *exit* door need not swing in the direction of *exit* travel where it serves,

(a) a room, *suite* or *floor area* having an *occupant load* of not more than 60 persons, or

(b) as part of a *means of egress* from more than one *floor area* and the *floor areas* so served have a total *occupant load* of not more than 60 persons.

3.4.6.12. Self-Closing Devices

(1) An *exit* door that is normally required to be kept closed,

(a) shall be provided with a self-closing mechanism, and

(b) shall not be secured in an open position except as permitted by Sentence 3.1.8.12.(1).

3.4.6.13. Sliding Doors

(1) Except as permitted by Sentence (2) an *exit* door leading directly to outdoors at ground level is permitted to be a sliding door provided it is released in conformance with Sentence 3.3.1.11.(1).

(2) An *exit* door serving a Group B, Division 1 *occupancy*, or an *impeded egress zone* in other *occupancies*, is permitted to be a sliding door that does not conform to Sentence 3.3.1.11.(1) provided it is designed to be released in conformance with Article 3.3.1.12.

3.4.6.14. Revolving Doors

(1) Except as permitted by Sentence (3), a revolving door, if used, shall,

(a) be collapsible,

(b) have hinged doors providing equivalent exiting capacity located adjacent to it,

(c) be used as an *exit* from the ground floor level only,

(d) be not less than 3 m from the foot of any stairway, and

(e) have all glass in door leaves and enclosure panels conforming to,

(i) CAN/CGSB-12.1-M, "Tempered or Laminated Safety Glass", or

(ii) CAN/CGSB-12.11-M, "Wired Safety Glass".

(2) Except as permitted by Sentence (3), a revolving door shall not be considered to have an exiting capacity for more than 45 persons.

(3) An electrically powered revolving door is not required to conform to Sentences (1) and (2) provided,

(a) the door leaves will collapse and stop automatic rotation of the door system and not obstruct the doorway if a force not more than that specified in Sentence 3.4.6.15.(2) is applied at the centre of a door leaf,

(b) the door leaves are capable of being opened from inside the *building* without requiring keys, special devices, or specialized knowledge of the door opening mechanism,

(c) the allowable exiting capacity is based on the clear width of passage through the door enclosure when the doors are fully collapsed,

(d) a permanent sign, whose centreline is between 1 000 mm and 1 500 mm above the floor, is placed on each face of each door leaf indicating the method for collapsing the door leaf in an emergency, and

(e) glass used for door leaves and enclosure panels is safety glass conforming to,

(i) CAN/CGSB-12.1-M, "Tempered or Laminated Safety Glass", or

(ii) CAN/CGSB-12.11-M, "Wired Safety Glass".

3.4.6.15. Door Release Hardware

(1) Except for *dwelling units*, and except for devices on doors serving a *contained use area* or an *impeded egress zone* designed to be released in conformance with Article 3.3.1.12., and except as permitted by Sentence (4), locking, latching and other fastening devices on every *exit* door shall permit the door to be readily opened from the inside with not more than one releasing operation and without requiring keys, special devices or specialized knowledge of the door opening mechanism.

(2) If a door is equipped with a latching mechanism, a device that will release the latch and allow the door to swing wide open when a force of not more than 90 N is applied to the device in the direction of travel to the *exit* shall be installed on,

(a) every *exit* door from a *floor area* containing an *assembly occupancy* having an *occupant load* more than 100,

(b) every door leading to an *exit* lobby from an *exit* stair shaft, and every exterior door leading from an *exit* stair shaft in a *building* having an *occupant load* more than 100, and

(c) every *exit* door from a *floor area* containing a *high hazard industrial occupancy*.

(3) Except as required by Sentence 3.8.3.3.(7), every *exit* door shall be designed and installed so that, when the latch is released, the door will open under a force of not more than 90 N, applied at the knob or other latch releasing device.

(4) Electromagnetic locks that do not incorporate latches, pins or other similar devices to keep the door in the closed position are permitted to be installed on *exit* doors other than doors described in Sentence (5) provided,

(a) the *building* is equipped with a fire alarm system conforming to Subsection 3.2.4.,

(b) the locking device, and all similar devices in the *access to exit* leading to the *exit* door, are installed as ancillary devices to the fire alarm system and release immediately upon activation of,

(i) the *alarm signal* where a single stage fire alarm system is installed,

(ii) except as provided in Subclause (iii), the *alert signal* where a 2 stage fire alarm system is installed, or

(iii) the *alarm signal* of a 2 stage fire alarm system installed in a *care or detention occupancy*,

(c) the locking device releases immediately upon loss of power to the fire alarm control panel or loss of power controlling the electromagnetic locking mechanism and its associated auxiliary controls,

(d) the locking device releases immediately upon actuation of a manually operated switch readily accessible only to authorized personnel and located near the main entrance of the *building* or in the central alarm and control facility of Sentence 3.2.6.12.(1),

(e) the locking device releases immediately upon a fault being detected in the electrical circuit between the fire alarm control panel and the controller of the locking device,

(f) the locking device releases immediately upon the operation of a manual pull station for the fire alarm system located on the wall not more than 600 mm from the door,

(g) a legible sign having the words **EMERGENCY EXIT UNLOCKED BY FIRE ALARM** is permanently mounted on the door,

(h) the lettering on the sign required in Clause (g) is at least 25 mm high with a 5 mm stroke,

(i) upon release, the locking device must be reset manually by the actuation of the switch referred to in Clause (d),

(j) the operation of any by-pass switch, where provided for testing of the fire alarm system, causes an audible signal and a visual signal to be indicated at the fire alarm annunciator panel and at the monitoring station of Clause 3.2.4.7.(4) (a), and

(k) emergency lighting is provided at the doors.

(5) Except as permitted in Sentences (6) and (7), electromagnetic locks are not permitted to be installed on *exit* doors,

(a) described in Clauses (2)(a), (b) or (c),

(b) serving an elementary or secondary school, or

(c) leading directly from a *high hazard industrial occupancy*.

(6) Electromagnetic locks are permitted to be installed on an exterior door leading from an *exit* stairway in a *building* serving only a Group B, Division 2 *major occupancy* or a Group B, Division 3 *major occupancy*.

(7) Electromagnetic locks are permitted to be installed on an *exit* door that serves only a *gaming premises* if,

(a) the *gaming premises* is located within a *sprinklered floor area*,

(b) *smoke detectors* are installed in each room and each corridor accessible to the public,

(c) a force of not more than 90 N applied to the door opening hardware initiates an irreversible process that will release the locking device within 15 s and not relock until the door has been opened, and

(d) a legible sign conforming with Clause (4) (h) is permanently mounted on the *exit* door to indicate that the locking device will release within 15 s of applying pressure to the door release hardware.

(8) Door hardware for the operation of the doors referred to in this Section shall be installed at a height not more than 1 200 mm above the finished floor.

3.4.6.16. Reserved

3.4.6.17. Emergency Access to Floor Areas

(1) In a *building* more than 6 *storeys* in *building height*,

(a) except as permitted by Sentence (3), doors providing access to *floor areas* from *exit* stairs shall not have locking devices to prevent entry into,

  (i) any *floor area* designated as an area of refuge,

  (ii) *floor areas* located at intervals of 5 *storeys* or less, and

  (iii) at least one of the three highest *storeys*,

(b) doors referred to in Clause (a) that provide access into the *floor area* shall be identified by a sign on the stairway side to indicate that they are openable from that side, and

(c) a master key to fit all door locking devices that are intended to prevent entry into a *floor area* from an *exit* stair shall be provided in a designated location accessible to fire fighters, or the door shall be provided with a wired glass panel not less than 0.0645 m^2 in area and located not more than 300 mm from the door opening hardware.

(2) If access to *floor areas* through unlocked doors is required by Clause (1)(a) or through electromagnetically locked doors as permitted by Sentence (3), it shall be possible for a person entering the *floor area* to have access through unlocked doors or through electromagnetically locked doors within the *floor area* to at least one other *exit*.

(3) Electromagnetic locking devices may be installed on the doors providing access to *floor areas* from *exit* stairs as required by Clause (1)(a), provided all locking device release and signage provisions in Sentence 3.4.6.15.(4) are installed on both sides of the doors.

(4) In a *building* not more than 6 *storeys* in *building height*, doors providing access from *exit* stairs to a *floor area* containing a *hotel* are permitted to have locking devices to prevent entry into the *floor area* provided the requirements in Clause (1)(c) are complied with.

3.4.6.18. Floor Numbering

(1) Arabic numerals indicating the assigned floor number shall,

(a) be mounted permanently on each side of doors to *exit* stair shafts,

(b) be not less than 60 mm high, raised approximately 0.7 mm above the surface,

(c) be located 1 500 mm from the finished floor, and

(d) be contrasting in colour with the surface to which they are applied.

(2) Upper case letters indicating the designation assigned to each *exit* stair shaft shall be mounted permanently on each side of doors to the *exit* stair shaft and shall,

(a) be not less than 60 mm high, raised approximately 0.7 mm above the surface,

(b) be located 1 500 mm from the finished floor, and

(c) be contrasting in colour with the surface on which they are applied.

3.4.7. Fire Escapes

3.4.7.1. Scope

(1) Except as permitted by Sentence (2), fire escapes shall not be erected on a *building*.

(2) If it is impracticable to provide one or more of the *exit* facilities listed in Article 3.4.1.4., fire escapes conforming to Articles 3.4.7.2. to 3.4.7.7. are permitted to serve *floor areas* in an existing *building* provided the *floor areas* served are,

(a) not in an elementary or secondary school,

(b) not more than 2 *storeys* above ground level in *care or detention occupancies*, and

(c) not more than 5 *storeys* above ground level in other *occupancies*.

3.4.7.2. Fire Escape Construction

(1) Fire escapes shall be of metal or concrete, of the stair type extending to ground level, constructed throughout in a strong substantial manner and securely fixed to the *building*, except that wooden fire escapes are permitted to be used on *buildings* of *combustible construction* if all posts and brackets are not less than 89 mm in their least dimension and all other woodwork is not less than 38 mm in its least dimension.

3.4.7.3. Access to Fire Escapes

(1) Access to fire escapes shall be from corridors through doors at floor level, except that access from a *dwelling unit* is permitted to be through a casement window having an unobstructed opening not less than 1 100 mm high by 550 mm wide with a sill height of not more than 900 mm above the inside floor.

(2) The clear area of a fire escape balcony onto which a door opens, shall be not less than 1 m^2.

3.4.7.4. Protection of Fire Escapes

(1) If a fire escape serves any *storey* above the second, openings located in a zone described in Sentence (2), including access doorways in the exterior walls of the *building* to which the fire escape is attached, shall be protected by *closures* conforming to Subsection 3.1.8.

(2) The zone referred to in Sentence (1) extends from any balcony, platform or stairway of a fire escape to a distance,

(a) 3 m horizontally,

(b) 10 m below, and

(c) 1 800 mm above.

3.4.7.5. Stairs

(1) Stairs shall be inclined at an angle of not more than 45° with the horizontal, and their steps shall have risers not more than 210 mm high and treads not less than 220 mm wide exclusive of nosing.

(2) Stairway headroom shall be not less than 1 950 mm plus the height of one riser measured vertically above the nosing of any tread or platform.

(3) The width of a fire escape shall conform to Articles 3.4.3.1., 3.4.3.2., and 3.4.3.4., except that the width is permitted to be reduced to 550 mm provided the fire escape serves,

(a) not more than 3 *storeys*, and

(b) not more than 15 persons.

(4) If a flight of stairs leading to the ground at the foot of a fire escape is not fixed in position, it shall,

(a) be held in the raised position without a latch or locking device,

(b) be fitted with a counterbalancing device,

(c) be easily and quickly brought into position for use, and

(d) reach the ground in the lowered position.

3.4.7.6. Guards and Railings

(1) The open sides of every platform, balcony and stairway forming part of a fire escape shall be protected by *guards* not less than 920 mm high measured vertically above the nosing of any tread or platform.

(2) The top rail of a *guard* is permitted to serve as a handrail if it is free from obstructions that could break a handhold.

(3) A wall handrail shall be installed if the fire escape is more than 550 mm wide.

(4) Openings through any *guard* that is required by Sentence (1) shall be of a size that will prevent the passage of a sphere having a diameter more than 100 mm unless it can be shown that the location and size of openings that exceed this limit do not represent a hazard.

(5) Unless it can be shown that the location and size of openings do not present a hazard, a *guard* for a fire escape shall be designed so that no member, attachment or opening located between 140 mm and 900 mm above a platform or the nosing of any tread will facilitate climbing.

3.4.7.7. Landings

(1) Platforms for a fire escape shall be provided in conformance with the requirements for stair landings in Article 3.4.6.3.

Section 3.5. Vertical Transportation

3.5.1. General

3.5.1.1. Scope

(1) This Section applies to vertical transportation facilities installed in a *building*, including elevators, escalators and dumbwaiters.

(2) Elevators in a *building* within the scope of Subsection 3.2.6. shall conform to Articles 3.2.6.8. and 3.2.6.9.

3.5.2. Elevator Requirements

3.5.2.1. Required Elevator

(1) In a Group B, Division 2 or 3 *occupancy*, if sleeping rooms or patient or resident services are provided on more than one floor level and the floor levels are not connected by ramps conforming to Article 3.8.3.4., such floor levels shall be served by at least one elevator that is large enough to accommodate a stretcher in a horizontal position.

3.5.2.2. Barrier-Free Design

(1) Passenger elevators shall conform to Appendix E of CSA B44, "Safety Code for Elevators".

3.5.3. Fire Separations

3.5.3.1. Fire Separations for Elevator Hoistways

(1) Except as permitted by Sentence (2), a *vertical service space* used as an elevator hoistway shall be separated from all other portions of each adjacent *storey* by a *fire separation* having a *fire-resistance rating* conforming to Table 3.5.3.1. for the *fire-resistance rating* required by Subsection 3.2.2. for,

(a) the floor assembly above the *storey*, or

(b) the floor assembly below the *storey*, if there is no floor assembly above.

(2) Passenger elevators, other than those provided for fire fighters in accordance with Article 3.2.6.9., are permitted to be located within or adjacent to the opening of an *interconnected floor space* protected in conformance with the requirements of Articles 3.2.8.3. to 3.2.8.11., Sentences 3.2.8.2.(4) and (6) without being enclosed in a hoistway separated from the remainder of the *interconnected floor space* provided the elevator machinery is located in a room separated from the remainder of the *building* by a *fire separation* whose *fire-resistance rating* is not less than that required for hoistways by Sentence (1).

(3) Where the elevator described in Sentence (2) has doors opening into *storeys* above or below the *interconnected floor space* it shall be protected by vestibules conforming to the requirements of Sentence 3.2.8.5.(1).

Table 3.5.3.1.
Fire Separation for Vertical Transportation Space

Forming Part of Articles 3.5.3.1. and 3.5.3.2.

COLUMN 1	COLUMN 2	COLUMN 3
Fire-Resistance Rating of *Fire Separation* Required for Floor Assembly	Minimum *Fire-Resistance Rating* of *Vertical Service Space* for Elevator Hoistway	Minimum *Fire-Resistance Rating* of *Vertical Service Space* for Dumbwaiters
less than 45 min	45 min	---
45 min	45 min	45 min
1 h	1 h	45 min
1.5 h	1 h	1 h
2 h or more	1.5 h	1 h

3.5.3.2. Vertical Service Spaces for Dumbwaiters

(1) A *vertical service space* containing a dumbwaiter shall be separated from all other portions of each adjacent *storey* by a *fire separation* having a *fire-resistance rating* conforming to Table 3.5.3.1. for the *fire-resistance rating* required by Subsection 3.2.2. for,

(a) the floor assembly above the *storey*, or

(b) the floor assembly below the *storey*, if there is no floor assembly above.

3.5.3.3. Fire Separations for Elevator Machine Rooms

(1) Except as permitted by Sentence (2), a room containing elevator machinery shall be separated from all other parts of the *building* by a *fire separation* having a *fire-resistance rating* not less than that required for the *vertical service space* containing the elevator hoistway.

(2) A room containing elevator machinery need not be separated from the elevator hoistway that it serves provided the room and the hoistway are separated from all other parts of the *building* by a *fire separation* having a *fire-resistance rating* not less than that required for the *vertical service space* containing the elevator hoistway.

3.5.4. Dimensions and Signs

3.5.4.1. Elevator Car Dimensions

(1) If an elevator is installed to conform to the requirements of Article 3.3.1.7., or if one or more elevators are provided in a *building* more than three *storeys* in *building height*, each *storey* having elevator service shall be served by at least one elevator that has inside dimensions that will accommodate and provide adequate access for a patient stretcher 2 010 mm long and 610 mm wide in the prone position

(2) An elevator satisfying the requirements of Sentence (1) shall be clearly identified on the main entrance level of the *building*.

Section 3.6. Service Facilities

3.6.1. General

3.6.1.1. Scope

(1) The provisions of this Section apply to *horizontal service spaces*, *vertical service spaces*, *attic or roof spaces*, ducts, crawl spaces, shaft spaces, *service rooms*, and mechanical penthouses, and facilities contained in any of them.

(2) Except for *plenum* requirements in 3.6.4.3., the fire safety characteristics of heating, ventilating and *air-conditioning* systems shall comply with Part 6.

3.6.1.2. Reserved

3.6.1.3. Storage Use Prohibition

(1) *Service spaces* shall not be designed to facilitate subsequent use as storage space.

3.6.1.4. Reserved

3.6.1.5. Fixed Access Ladders

(1) If a fixed ladder is installed to provide access to a roof of a *building*, the design and installation of the attachment and anchorage system for the ladder shall be as described in Supplementary Standard SB-8.

3.6.2. Service Rooms

3.6.2.1. Fire Separations around Service Rooms

(1) Except as permitted by Sentences (2), (8), (9) and (10), fuel-fired *appliances* shall be installed in *service rooms* separated from the remainder of the *building* by *fire separations* having a *fire-resistance rating* not less than 1 h.

(2) Except as required by Sentence (3), a fuel-fired *appliance* that serves only one room or *suite* is not required to be installed in a *service room* separated from the remainder of the *building*.

(3) A solid fuel fired *appliance* shall not be located in a *repair garage*, a *storage garage*, or any other location where it could be exposed to flammable vapours or gases unless,

(a) it is enclosed in a *service room* that is separated from the remainder of the *building* by a *fire separation* having a *fire-resistance rating* not less than 1 h,

(b) it is supplied with combustion air directly from outside the *building*, and

(c) the heat that it generates is supplied indirectly to the space served by means of ducts or piping.

(4) A *service room* containing an incinerator shall be separated from the remainder of the *building* by a *fire separation* having a *fire-resistance rating* not less than 2 h.

(5) Equipment that uses a liquid having a *flash point* below 93.3°C shall be installed in a *service room* separated from the remainder of the *building* by a *fire separation* having a *fire-resistance rating* not less than 1 h.

(6) Electrical equipment that is required to be located in a *service room* by a regulation made under the *Electricity Act, 1998*, shall be installed in a *service room* separated from the remainder of the *building* by a *fire separation* having a *fire-resistance rating* not less than 1 h.

(7) Except as permitted by Sentence (8), in a *storey* that is not *sprinklered*, a *service room* that contains service equipment other than that addressed by Sentences (1) to (6), shall be separated from the remainder of the *building* by a *fire separation* having a *fire-resistance rating* not less than 1 h.

(8) If a *service room* referred to in Sentence (7) contains a limited quantity of service equipment, and the service equipment neither constitutes a fire hazard nor is essential to the operation of fire safety systems in the *building*, the requirements for a *fire separation* shall not apply.

(9) A *fire separation* is not required between a fireplace and the space it serves.

(10) A *fire separation* is not required between a roof-top *appliance* and the *building* it serves.

(11) The *fire separation* provisions for a fuel-fired *appliance* in a portable classroom shall conform to Article 3.9.3.7.

3.6.2.2. Service Rooms under Exits

(1) A *service room* containing service equipment subject to possible explosion, such as *boilers* operating in excess of 100 kPa (gauge) and some types of refrigerating machinery and transformers, shall not be located directly under a required *exit*.

3.6.2.3. Service Equipment

(1) A *service room* containing space heating, space cooling and service water heating *appliances* is permitted to contain other service equipment such as electrical service equipment.

3.6.2.4. Incinerator Rooms

(1) A *service room* containing an incinerator shall not contain other fuel-fired *appliances*.

3.6.2.5. Combustible Refuse Storage

(1) Except as required by Sentence 3.6.3.3.(9), a room for the storage of *combustible* refuse shall be,

(a) separated from the remainder of the *building* by a *fire separation* with a *fire-resistance rating* not less than 1 h, and

(b) *sprinklered*.

3.6.2.6. Door Swing for Service Rooms

(1) A swing-type door from a *service room* containing a *boiler* or incinerator shall swing outward from the room, except that the door shall swing inward if the door opens onto a corridor or any room used for an *assembly occupancy*.

3.6.2.7. Electrical Equipment Vaults

(1) Where an electrical equipment vault is required by a regulation made under the *Electricity Act, 1998*, the electrical equipment vault shall be totally enclosed by a *fire separation* of solid masonry or concrete construction having a *fire-resistance rating* of not less than 3 h if the vault is not provided with an automatic fire extinguishing system and not less than 2 h if the vault is so protected.

(2) Where a *building* is required to be *sprinklered*, the electrical equipment vault described in Sentence (1) need not be *sprinklered* provided,

(a) the vault is designed for no purpose other than to contain the electrical equipment, and

(b) a *smoke detector* is provided in the vault that will actuate the *building* fire alarm system in the event of a fire in the vault.

(3) A vault, that is part of a *building* and houses electrical equipment indoors, shall have,

(a) roofs or ceilings consisting of reinforced concrete of adequate strength for the conditions and not less than 150 mm thick, and

(b) floors consisting of reinforced concrete of adequate strength for the conditions and not less than 150 mm thick, except that floors that are at excavation level are permitted to be of reinforced concrete not less than 100 mm thick.

(4) Walls, roofs or ceilings, and floors shall be adequately anchored together in a manner designed to resist dislodgement by explosion.

(5) Only pipes or ducts necessary for fire protection or the proper operation of the electrical installation shall penetrate the *fire separations* surrounding the electrical equipment vault.

(6) A ventilation duct or opening, that penetrates the *fire separation* to the outdoors, need not be protected by a *closure* at the penetration.

(7) Each door to an electrical equipment vault shall be provided with a substantial lock or padlock.

(8) Explosion-relief devices and vents or other protective measures shall be provided for every electrical equipment vault containing dielectric liquid filled electrical equipment in conformance with Sentence 3.3.1.19.(2).

(9) Every electrical equipment vault shall be provided with a ventilation system designed in conformance with Part 6 to prevent the ambient temperature in the vault from exceeding 40°C.

(10) Where the vault ventilation system in Sentence (9) is directly from an outdoor area by natural ventilation without the use of ducts, and where the electrical equipment is the principal source of heat, the combined net area of inlet and outlet openings shall be not less than 0.002 m^2/kVa of electrical equipment capacity with a minimum of 0.093 m^2, except that,

(a) where equipment in the power class as described in CAN3-C88, "Power Transformers and Reactors" is installed, ventilation requirements are permitted to be based on the actual full-load losses, or

(b) where the equipment is installed for emergency purposes only and is not normally energized, it need not be considered in determining the ventilation requirements.

(11) In the vault ventilation system in Sentence (10), the inlet for fresh air shall lead from an outdoor area and shall terminate at a point not more than 1 000 mm above the floor level of the vault.

(12) Where the vault ventilation system in Sentence (9) is a mechanical system, it shall be separate from the system for the remainder of the *building* and shall be designed so that,

(a) the vault temperature is thermostatically controlled,

(b) the fan is located so that it may be serviced without danger to personnel,

(c) a high temperature alarm is provided in the vault,

(d) the system is automatically shut off in the event of a fire in the vault, and

(e) a filter is provided in the air inlet if there is a possibility of dirt being drawn in.

(13) All ventilation openings shall be protected in conformance with Sentences 6.2.3.12.(3) and (4) and the protection shall be installed in such a manner that it cannot be removed from the outside by the use of common tools and it is tamperproof.

(14) Except as permitted in Sentence (15), the floor of the electrical equipment vault described in Sentences (1) and (2) shall be liquid tight and surrounded by liquid tight walls and sills of sufficient height to confine within the vault all of the liquid from the largest item of electrical equipment, but to a height of not less than 100 mm.

(15) The floor of the electrical equipment vault described in Sentences (1) and (2) may be provided with a floor drain connected to a covered sump capable of holding all of the liquid from the largest item of electrical equipment, and the connection shall have a *noncombustible* trap to prevent the spread of fire from the vault to the sump.

3.6.2.8. Emergency Power Installations

(1) A generator to supply emergency power for lighting, fire safety and life safety systems shall be located in a room that,

(a) is separated from the remainder of the *building* by a *fire separation* with a *fire-resistance rating* not less than ,

  (i) 2 h for *buildings* within the scope of Subsection 3.2.6., and

(ii) 1 h for other *buildings*, and

(b) contains only the generating set and equipment that is related to the emergency power supply system.

3.6.2.9. Storage of Oxygen Containers

(1) In a Group B, Division 2 or 3 *occupancy*, a room for the storage of oxygen containers shall be,

(a) separated from the remainder of the *building* by a *fire separation* having a *fire-resistance rating* not less than 1 h,

(b) designed for the storage of oxygen containers only,

(c) vapour tight,

(d) lined with *noncombustible* finish,

(e) separately exhausted to the exterior, and

(f) equipped with racks to store the containers.

3.6.3. Vertical Service Spaces and Service Facilities

3.6.3.1. Fire Separations for Vertical Service Spaces

(1) Except as required by Section 3.5., a *vertical service space* shall be separated from all other portions of each adjacent *storey* by a *fire separation* having a *fire-resistance rating* conforming to Table 3.6.3.1. for the *fire-resistance rating* required by Subsection 3.2.2. for,

(a) the floor assembly above the *storey*, or

(b) the floor assembly below the *storey*, if there is no floor assembly above.

(2) A *vertical service space* that does not extend through the roof of a *building* shall be enclosed at the top with construction having a *fire-resistance rating* not less than that required for the *vertical service space* walls.

(3) A *vertical service space* that does not extend to the bottom of a *building* shall be enclosed at the lowest level with construction having a *fire-resistance rating* not less than that required for the *vertical service space* walls.

(4) A vent from a *vertical service space* not extending to the roof shall be enclosed within the *building* with construction having a *fire-resistance rating* not less than that required for the *vertical service space* walls.

Table 3.6.3.1.
Fire Separations for Vertical Service Space

Forming Part of Sentence 3.6.3.1.(1)

Column 1	Column 2
Fire-Resistance Rating of *Fire Separation* Required for Floor Assembly	Minimum *Fire-Resistance Rating* of *Vertical Service Space*
less than 45 min	---
45 min	45 min
1 h	45 min
1.5 h	1 h
2 h or more	1 h

(5) Only openings that are necessary for the use of the *vertical service space* shall be permitted through a *vertical service space* enclosure.

3.6.3.2. Foamed Plastic Protection

(1) Foamed plastic insulation in a *vertical service space* shall be protected in conformance with Article 3.1.5.12.

3.6.3.3. Linen and Refuse Chutes

(1) A linen chute or refuse chute shall,

(a) be impervious to moisture,

(b) have a smooth internal surface,

(c) be corrosion-resistant,

(d) be constructed of *noncombustible* material, and

(e) be located in a shaft in which there are no services other than *noncombustible* drain, waste and vent piping or *noncombustible* water piping.

(2) A shaft containing a linen chute or refuse chute shall have a *fire-resistance rating* conforming to Sentence 3.6.3.1.(1), but not less than,

(a) 1 h if the chute outlet for the discharge room is protected by an automatic, self-latching *closure* held open by a fusible link, or

(b) 2 h if no *closure* is provided at the chute outlet into the discharge room.

(3) An interior linen chute or refuse chute shall extend not less than 1 000 mm above the roof and shall be vented above the roof with a vent that,

(a) has an unobstructed area not less than the cross-sectional area of the chute, and

(b) is equipped with a cover that will open automatically, or that can be opened manually, in the event of a fire in the chute.

(4) Intake openings for a linen chute or a refuse chute shall,

(a) have an area not more than 60% of the cross-sectional area of the chute, and

(b) be fitted with *closures* designed to close automatically and latch after use.

(5) Intake openings for a linen chute or a refuse chute shall be located in rooms or compartments that,

(a) have no dimension less than 750 mm,

(b) are separated from the remainder of the *building* by a *fire separation* with a *fire-resistance rating* not less than 45 min,

(c) are designed for no other purpose, and

(d) do not open directly into an *exit*.

(6) Sprinklers shall be installed at the top of each linen chute or refuse chute, at alternate floor levels and in the room or bin into which the chute discharges.

(7) The room into which a linen chute discharges shall be separated from the remainder of the *building* by a *fire separation* with a *fire-resistance rating* not less than 1 h.

(8) A refuse chute shall be equipped at the top with spray equipment for washing-down purposes.

(9) A refuse chute shall discharge only into a room or bin separated from the remainder of the *building* by a *fire separation* with a *fire-resistance rating* not less than 2 h.

(10) The room or bin into which a refuse chute discharges shall be of sufficient size to contain the refuse between normal intervals of emptying, be impervious to moisture and be equipped with a water connection and floor drain for washing-down purposes.

(11) A room into which a refuse chute discharges shall contain no service equipment that is not related to refuse handling and disposal.

3.6.3.4. Exhaust Duct Negative Pressure

(1) If a *vertical service space* contains an *exhaust duct* that serves more than one *fire compartment*, the duct shall have a fan located at or near the exhaust outlet to ensure that the duct is under negative pressure.

3.6.4. Horizontal Service Spaces and Service Facilities

3.6.4.1. Scope

(1) This Subsection applies to *horizontal service spaces* and service facilities, including ceiling spaces, duct spaces, crawl spaces and *attic or roof spaces*.

3.6.4.2. Fire Separations for Horizontal Service Spaces

(1) A *horizontal service space* that penetrates a required vertical *fire separation* shall be separated from the remainder of the *building* it serves in conformance with Sentence (2).

(2) If a *horizontal service space* or other concealed space is located above a required vertical *fire separation* other than a vertical shaft, this space need not be divided at the *fire separation* as required by Article 3.1.8.3. provided the construction between this space and the space below is a *fire separation* with a *fire-resistance rating* equivalent to that required for the vertical *fire separation*, except that the *fire-resistance rating* is permitted to be not less than 30 min if the vertical *fire separation* is not required to have a *fire-resistance rating* more than 45 min.

3.6.4.3. Plenum Requirements

(1) A concealed space used as a *plenum* within a floor assembly or within a roof assembly need not conform to Sentence 3.1.5.15.(1) and Article 6.2.3.2. provided,

(a) all materials within the concealed space have a *flame-spread rating* not more than 25 and a smoke developed classification not more than 50, except for,

   (i) tubing for pneumatic controls,

   (ii) optical fibre cables and electrical wires and cables that exhibit a flame spread not more than 1.5 m, a smoke density not more than 0.5 at peak optical density and a smoke density not more than 0.15 at average optical density when tested in conformance with the Flame and Smoke Test in the Appendix to CAN/CSA C22.2 No. 0.3, "Test Methods for Electrical Wires and Cables" (FT6 Rating),

   (iii) optical fibre cables and electrical wires and cables that are located in totally enclosed *noncombustible* raceways,

   (iv) totally enclosed nonmetallic raceways that exhibit a horizontal flame distance of not more than 1.5 m, an average optical smoke density of not more than 0.15, and a peak optical smoke density of not more than 0.5 when tested in conformance with the Test for Flame Propagation and Smoke Density Values in Section 3.3 of the ULC/ORD-C2024, "Fire Tests for Optical Fibre Cable Raceway" (FT-6 Rating), and

   (v) single conductor electrical wires and cables that exhibit a vertical char of not more than 1.5 m when tested in conformance with the Vertical Flame Test —Cables in Cabletrough in Clause 4.11.4. of CSA C22.2 No. 0.3, "Test Methods for Electrical Wires and Cables" (FT4 Rating), and

(b) the supports for the ceiling membrane are of *noncombustible* material having a melting point not below 760°C.

(2) If a concealed space referred to in Sentence (1) is used as a return-air *plenum* and incorporates a ceiling membrane that forms part of the required *fire-resistance rating* of the assembly, every opening through the membrane shall be protected by a *fire stop flap* that shall,

(a) stop the flow of air into the concealed space in the event of a fire,

(b) be supported in a manner that will maintain the integrity of the ceiling membrane for the duration of time required to provide the required *fire-resistance rating*, and

(c) conform to CAN4-S112.2-M, "Fire Test of Ceiling Firestop Flap Assemblies".

(3) Asbestos paper shall not be exposed in supply and return-air systems.

3.6.4.4. Attic or Roof Space Access

(1) An *attic or roof space* more than 600 mm high shall be provided with access from the floor immediately below by a hatchway not less than 550 mm by 900 mm or by a stairway.

3.6.4.5. Horizontal Service Space Access

(1) A *horizontal service space*, consisting of ceiling and duct spaces, that is more than 1 200 mm high and 600 mm wide shall have inspection doors not less than 300 mm in both horizontal and vertical dimensions placed so that the entire interior of the duct or space can be viewed.

3.6.4.6. Crawl Space Access

(1) A crawl space shall have at least one access opening not less than 550 mm by 900 mm.

Section 3.7. Health Requirements

3.7.1. Height and Area of Rooms

3.7.1.1. Room and Space Height

(1) The height of every room and space shall be sufficient so that the ceiling or ceiling fixtures do not obstruct movement or activities below.

(2) The unobstructed height in *dwelling units* and sleeping rooms in Group C *occupancies* shall conform to Subsection 9.5.3.

3.7.1.2. Residential Room Dimensions

(1) The areas of rooms in *dwelling units*, dormitories, boarding houses and rooming houses shall conform to Part 9.

3.7.1.3. Sleeping Areas in Group B and Child Care Facilities

(1) Except as provided in Sentence (2), a sleeping area in a Group B *occupancy* shall provide not less than 4.7 m^2 per person in a room having,

(a) an area not less than 7 m^2,

(b) a horizontal dimension not less than 2 000 mm, and

(c) a ceiling height not less than 2 300 mm.

(2) Sleeping rooms for residents in nursing homes shall have, exclusive of space provided for washrooms and for built-in or portable clothes closets, a floor space not less than,

(a) 10.22 m^2 in a single-bed unit,

(b) 16.72 m^2 in a two-bed unit,

(c) 25.08 m^2 in a three-bed unit, and

(d) 29.73 m^2 in a four-bed unit.

(3) A child care facility shall provide sleeping accommodation having not less than 0.93 m^2 of floor surface area for each child with not less than 2 300 mm ceiling height over the entire room area.

3.7.1.4. Sleeping Areas in Camps

(1) *Recreational camps* shall have an area in the sleeping quarters of not less than 3.72 m^2 per camper or, if double or triple tier bunk units are used, 2.79 m^2 per camper.

(2) A *camp for housing of workers* shall have an area of not less than 3.72 m^2 per employee in every room used for sleeping purposes.

3.7.2. Windows

3.7.2.1. Window Areas

(1) Except as provided in Sentences (2) and (3) or otherwise permitted, every room used for sleeping in any *building*, and every principal room such as living room, dining room or combination of them in *dwelling units* shall be provided with windows having areas conforming to Part 9, except that Article 9.7.1.3 does not apply.

(2) Nursing homes shall have,

(a) in an activity room, a sitting room or a lounge, one or more windows with a total unobstructed glass area, exclusive of skylights, of not less than 10% of the area of the room, and

(b) in a residents' sleeping room, one or more windows that,

  (i) have a total unobstructed glass area, exclusive of skylights, of not less than 10% of the area of the room,

  (ii) open to the outdoors and have a total unobstructed glass area, exclusive of skylights, of not less than 5% of the area of the room, and

  (iii) are installed with the bottom edge of the glass of every window not more than 660 mm above the floor.

(3) Play activity rooms in a child care facility and work areas in *live/work units* shall have one or more windows that conform to Clause (2)(a).

3.7.2.2. Window Protection in Apartment Buildings

(1) In Group C *major occupancy* apartment *buildings* protection shall be provided at windows to minimize the hazards to children in accordance with Sentences (2) to (4).

(2) Fixed windows within *dwelling units* that extend to less than 1 000 mm from the floor shall be protected by *guards* to at least 1 000 mm above the floor, or shall be designed to withstand the lateral *design loads* for balcony *guards* in Part 4.

(3) Except as provided in Sentence (4), in *dwelling units* any window located more than 2 000 mm above *grade* that opens within 1 500 mm of the floor shall be protected,

(a) by a *guard* conforming to Sentence 3.3.1.17.(2),

(b) by,

  (i) a controlled sash operation to restrict, when engaged, the opening of the operable sash to not more than 100 mm, and

  (ii) a heavy duty screen conforming to CAN/CSA-A440, "Windows", or

(c) by an alternative device that does not reduce the degree of safety provided by Clauses (a) or (b).

(4) Protection of a window need not be provided in a *dwelling unit* where an exterior balcony is constructed for the full length of a window.

3.7.3. Reserved

3.7.4. Plumbing Facilities

3.7.4.1. Plumbing and Drainage Systems

(1) Except as permitted in Sentence (3), each *building* situated on property that abuts on a *street* in which a public or municipal water main is located shall be provided with or have accessible to its occupants a *plumbing system* including a *potable* water supply, a *sanitary drainage system* and *plumbing fixtures*.

(2) When the installation of a *sanitary drainage system* is not possible because of the absence of a water supply, sanitary privies, chemical closets or other means for the disposal of human waste shall be provided.

(3) *Plumbing fixtures* need not be provided in a *building* that is not normally occupied by persons where such installations are impractical and other *fixtures* are available in nearby *buildings* when the subject *building* is in use.

3.7.4.2. Plumbing Fixtures, General

(1) For the purposes of this Subsection, the *occupant load* shall be determined in accordance with the provisions in Subsection 3.1.17. except that in a Group D *occupancy*, the area per person shall be 14 m^2.

(2) Except as provided in this Subsection, water closets shall be provided for each sex assuming that the *occupant load* is equally divided between males and females, unless the proportion of each sex expected in the *building* can be determined with reasonable accuracy.

(3) Except as provided in Sentence (4), urinals are permitted to be substituted for water closets required by this Subsection for males and may be counted as water closets provided the number of urinals is not more than,

(a) one fifth of the required number of water closets in hospitals and nursing homes, and

(b) two thirds of the required number of water closets in any other *occupancy*.

(4) If only 2 water closets are required for males, one urinal is permitted to be substituted for one of the water closets.

(5) Except as required in this Subsection, at least one lavatory shall be provided in a room containing one or 2 water closets or urinals, and at least one additional lavatory shall be provided for each additional 2 water closets or urinals.

(6) Wash fountains in circular or straight trough form are permitted to be provided in lieu of required lavatories provided each 500 mm of circumference or trough length is considered to be the equivalent of one lavatory.

(7) Except as permitted by Sentence (8) and Sentence 3.8.3.12.(2), if only one universal toilet room is provided in accordance with Section 3.8., the water closet in this room shall not be considered in determining the number of water closets required by this Subsection.

(8) Both sexes are permitted to be served by a single water closet if the *occupant load* is not more than 10 persons in,

(a) an *assembly occupancy* referred to in Article 3.7.4.3. except for,

  (i) elementary and secondary schools,

  (ii) child care facilities,

  (iii) places of worship, and

  (iv) undertaking premises,

(b) a *residential occupancy* referred to in Article 3.7.4.6.,

(c) a *business and personal service occupancy* referred to in Article 3.7.4.7., and

(d) an *industrial occupancy* referred to in Article 3.7.4.9.

(9) Any shelf or projection above a lavatory shall be located so that it will not be a hazard.

(10) Except for *dwelling units*, lavatories required by Sentence (5) shall be equipped with faucets that,

(a) operate automatically, or

(b) have lever type handles that do not close under spring action.

3.7.4.3. Plumbing Fixtures for Assembly Occupancies

(1) Except as permitted by Sentences (2) to (16) and Sentence 3.7.4.2.(8), the number of water closets required for *assembly occupancies* shall conform to Table 3.7.4.3.A.

Table 3.7.4.3.A.
Water Closets for Assembly Occupancies

Forming Part of Sentence 3.7.4.3.(1)

COLUMN 1 Number of Persons of Each Sex	COLUMN 2 Minimum Number of Water Closets for Males	COLUMN 3 Minimum Number of Water Closets for Females
1 - 25	1	1
26 - 50	1	2
51 - 75	2	3
76 - 100	2	4
101 - 125	3	5
126 - 150	3	6
151 - 175	4	7
176 - 200	4	8
201 - 250	5	9
251 - 300	5	10
301 - 350	6	11
351 - 400	6	12
Over 400	7 plus 1 for each additional increment of 200 males in excess of 400	13 plus 1 for each additional increment of 100 females in excess of 400

(2) Except for motion picture *theatres*, the number of water closets required for Group A, Division 1 *occupancies* shall conform to Table 3.7.4.3.B.

Table 3.7.4.3.B.
Water Closets for Assembly Occupancies

Forming Part of Sentence 3.7.4.3.(2)

COLUMN 1 Number of Persons of Each Sex	COLUMN 2 Minimum Number of Water Closets for Males	COLUMN 3 Minimum Number of Water Closets for Females
1 to 50	1	2
51 to 75	2	3
76 to 100	2	4
101 to 125	3	5
126 to 150	3	6
151 to 175	4	7
176 to 200	4	8
201 to 250	5	9
251 to 300	5	10
301 to 350	6	11
351 to 400	6	12
over 400	7 plus 1 for each additional increment of 200 males in excess of 400	13 plus 1 for each additional increment of 100 females in excess of 400

(3) The number of water closets required shall conform to Table 3.7.4.3.C. for,

(a) motion picture *theatres*,

(b) Group A, Division 3 *occupancies*,

(c) Group A, Division 4 *occupancies*, and

(d) *outdoor pools*.

Table 3.7.4.3.C.
Water Closets for Assembly Occupancies

Forming Part of Sentence 3.7.4.3.(3)

COLUMN 1	COLUMN 2
Number of Persons of Each Sex	Minimum Number of Water Closets for Each Sex
1 to 50	1
51 to 150	2
151 to 250	3
251 to 375	4
376 to 500	5
over 500	6 plus 1 for each additional increment of 150 persons of each sex in excess of 500

(4) Except as provided in Sentences (6) and (7), the number of water closets required for dining rooms, restaurants and cafeteria shall conform to Table 3.7.4.3.D.

Table 3.7.4.3.D.
Water Closets for Assembly Occupancies

Forming Part of Sentence 3.7.4.3.(4) and (7)

COLUMN 1	COLUMN 2
Number of Persons of Each Sex	Minimum Number of Water Closets for Each Sex
1 to 20	1
21 to 70	2
71 to 105	3
106 to 135	4
136 to 165	5
166 to 195	6
196 to 225	7
226 to 275	8
276 to 325	9
326 to 375	10
376 to 425	11
over 425	12 plus 1 for each additional increment of 50 persons of each sex in excess of 425

(5) The number of water closets required for establishments used primarily for the consumption of alcoholic beverages that provide limited or no food service shall conform to Table 3.7.4.3.E.

Table 3.7.4.3.E.
Water Closets for Assembly Occupancies

Forming Part of Sentence 3.7.4.3.(5)

COLUMN 1	COLUMN 2
Number of Persons of Each Sex	Minimum Number of Water Closets for Each Sex
1 to 50	2
51 to 70	3
71 to 90	4
91 to 110	5
111 to 140	6
141 to 180	7
181 to 220	8
221 to 260	9
over 260	10 plus 1 for each additional increment of 40 persons of each sex in excess of 260

(6) In every dining room, restaurant, cafeteria and alcoholic beverage establishment having more than 40 seats, separate sanitary facilities shall be provided for employees, in addition to facilities provided for patrons, and the number of water closets and lavatories required shall conform to Table 3.7.4.3.F.

Table 3.7.4.3.F.
Plumbing Fixtures for Assembly Occupancies

Forming Part of Sentence 3.7.4.3.(6) and (7)

COLUMN 1	COLUMN 2	COLUMN 3
Number of Employees of Each Sex	Minimum Number of Water Closets and Lavatories for Males	Minimum Number of Water Closets and Lavatories for Females
1 to 9	1	1
10 to 24	2	2
25 to 49	3	3
50 to 74	4	4
75 to 100	5	5
over 100	6 plus 1 for each additional increment of 30 male employees in excess of 100	6 plus 1 for each additional increment of 30 female employees in excess of 100

(7) Except as provided in Sentence (8), in every dining room, restaurant, cafeteria and alcoholic beverage establishment having not more than 40 seats, patrons are permitted to share the sanitary facilities provided for employees, and the minimum number of water closets and lavatories shall conform to Table 3.7.4.3.D. based on,

(a) a male *occupant load* of 50% of the number of seats plus the number of male employees, and

(b) a female *occupant load* of 50% of the number of seats plus the number of female employees.

(8) Where a separate employee washroom is provided, the same room may be used by both female and male employees provided that,

(a) the total number of employees is not more than 5, and

(b) the door to the room can be locked from the inside.

(9) The number of employees in Sentences (6). to (8) shall be the maximum number of employees who are normally present on the premises at one time and shall include only those who are present for more than 25 per cent of the working day.

(10) For a parking lot that is part of a restaurant where patrons are intended to eat in vehicles parked on the lot, the number of water closets required shall conform to,

(a) Table 3.7.4.3.G. where food service by employees is not provided on the parking lot, or

(b) Table 3.7.4.3.H. where employees serve food on the parking lot.

Table 3.7.4.3.G.
Water Closets for Assembly Occupancies

Forming part of Sentence 3.7.4.3.(10)

COLUMN 1	COLUMN 2
Number of Parking Spaces	Minimum Number of Water Closets for Each Sex
1 to 20	1
21 to 70	2
71 to 105	3
106 to 135	4
136 to 165	5
166 to 195	6
196 to 225	7
226 to 275	8
276 to 325	9
326 to 375	10
376 to 425	11
over 425	12 plus 1 for each additional increment of 50 parking spaces in excess of 425

(11) The number of water closets required for drive-in *theatres* shall conform to Table 3.7.4.3.H.

(12) The number of water closets required for dance halls and recreational establishments shall be at least one fixture for each 100 males and one fixture for each 75 females.

Table 3.7.4.3.H.
Water Closets for Assembly Occupancies

Forming part of Sentences 3.7.4.3.(10) and (11)

COLUMN 1	COLUMN 2
Number of Parking Spaces	Minimum Number of Water Closets for Each Sex
1 to 40	1
41 to 140	2
141 to 210	3
211 to 270	4
271 to 330	5
331 to 390	6
391 to 450	7
451 to 550	8
551 to 650	9
651 to 750	10
751 to 850	11
over 850	12 plus 1 for each additional increment of 100 parking spaces in excess of 850

(13) In a child care facility the maximum number of children per water closet and lavatory shall conform to Table 3.7.4.3.I.

Table 3.7.4.3.I.
Plumbing Fixtures for a Child Care Facility

Forming Part of Sentence 3.7.4.3.(13)

COLUMN 1	COLUMN 2
Age of Children	Maximum Number of Children per Water Closet and Lavatory
under 2	10 without regard to number of each sex
2 to 5	10 without regard to number of each sex
6 to 9	15 for males; 15 for females
over 9	30 for males; 26 for females

(14) The number of water closets required for elementary and secondary schools shall be at least one fixture for each 30 males and one fixture for each 26 females.

(15) The number of water closets required for non-residential college *buildings* shall be at least one fixture for each 100 males and one fixture for each 75 females.

(16) The number of water closets required for places of worship and undertaking premises shall be at least one fixture for each 150 persons of each sex.

3.7.4.4. Plumbing Fixtures for Care or Detention Occupancies

(1) The number of water closets and lavatories required for Group B, Division 1 *occupancies* shall be determined on the basis of the special needs of these *occupancies*.

(2) In a Group B, Division 2 or 3 *occupancy*, washrooms shall be provided so that each washroom,

(a) serves not more than four patients or residents,

(b) is accessible from patients' or residents' sleeping rooms,

(c) contains one water closet, and

(d) contains one lavatory.

(3) The number of water closets required for employees in Group B, Division 2 or 3 *occupancies* shall conform to Table 3.7.4.4.

Table 3.7.4.4.
Water Closets in Group B, Division 2 or 3 Occupancies

Forming Part of Sentence 3.7.4.4.(3)

COLUMN 1	COLUMN 2
Number of Persons of Each Sex	Minimum Number of Water Closets for Each Sex
up to 9	1
10 to 24	2
25 to 49	3
50 to 74	4
75 to 100	5
over 100	6 plus 1 for each additional increment of 30 persons of each sex in excess of 100

3.7.4.5. Plumbing Facilities for Dwelling Units

(1) A kitchen sink, lavatory, water closet and bathtub or shower stall shall be provided for every *dwelling unit* where a piped water supply is available.

3.7.4.6. Plumbing Fixtures for Other Residential Occupancies

(1) Except for *dwelling units* and as provided in Sentence (2), the number of water closets required for *residential occupancies* shall conform to Table 3.7.4.6.

Table 3.7.4.6.
Water Closets For Residential Occupancies

Forming Part of Sentence 3.7.4.6.(1)

COLUMN 1	COLUMN 2
Number of Persons of Each Sex	Minimum Number of Water Closets for Each Sex
up to 9	1
10 to 24	2
25 to 49	3
50 to 74	4
75 to 100	5
over 100	6 plus 1 for each additional increment of 30 persons of each sex in excess of 100

(2) At least one water closet or privy shall be provided for every,

(a) 10 campers of each sex in a *recreational camp*, and

(b) 10 employees of each sex in a *camp for housing of workers*.

(3) In *recreational camps* and *camps for housing of workers*, no fewer than two lavatories or provision for a pail or other portable container of sound construction shall be provided for each of the water closets or privies required in Sentence (2).

(4) A *camp for housing of workers* shall include,

(a) at least one shower or other area of bathing, and

(b) provisions for at least one washing machine or laundry tub for every 15 beds.

3.7.4.7. Plumbing Fixtures for Business and Personal Services Occupancies

(1) Except as provided in Sentence (2), the number of water closets required for *business and personal services occupancies* shall conform to Table 3.7.4.7.

(2) Not more than one water closet to serve both sexes need be provided in a Group D *occupancy* having an *occupant load* of not more than 5 persons.

Table 3.7.4.7.
Water Closets for Business and Personal Services Occupancies

Forming Part of Sentence 3.7.4.7.(1)

COLUMN 1	COLUMN 2
Number of Persons of Each Sex	Minimum Number of Water Closets for Each Sex
up to 9	1
10 to 24	2
25 to 49	3
50 to 74	4
75 to 100	5
over 100	6 plus 1 for each additional increment of 30 persons of each sex in excess of 100

3.7.4.8. Plumbing Fixtures for Mercantile Occupancies

(1) Except as provided in this Article, the number of water closets required for employees in *mercantile occupancies* shall conform to Table 3.7.4.8.

Table 3.7.4.8.
Water Closets for Mercantile Occupancies

Forming Part of Sentence 3.7.4.8.(1)

COLUMN 1	COLUMN 2
Number of Persons of Each Sex	Minimum Number of Water Closets for Each Sex
up to 9	1
10 to 24	2
25 to 49	3
50 to 74	4
75 to 100	5
over 100	6 plus 1 for each additional increment of 30 persons of each sex in excess of 100

(2) Except as provided in Sentence (4), the number of water closets required for the public in *mercantile occupancies* shall be at least one fixture for each 300 males and one fixture for each 150 females, except that,

(a) water closets provided for employees are permitted to be counted as part of those required for the public when these water closets are made accessible to the public, and

(b) where the total area of the *mercantile occupancy*, excluding *basements*, is not more than 600 m^2, not more than one water closet for each sex need be provided.

(3) Not more than one water closet to serve both sexes need be provided in a Group E *occupancy* where,

(a) the *occupant load* is not more than 9 persons, or

(b) where the total area of the *occupancy*, excluding *basements*, is not more than 300 m^2.

(4) For a restaurant classified as *mercantile occupancy*, the number of water closets and lavatories required shall conform to Article 3.7.4.3.

3.7.4.9. Plumbing Fixtures for Industrial Occupancies

(1) Except as provided in Sentence (2), the number of water closets and lavatories required for *industrial occupancies* shall conform to Table 3.7.4.9.

Table 3.7.4.9.
Plumbing Fixtures for Industrial Occupancies

Forming Part of Sentence 3.7.4.9.(1)

COLUMN 1	COLUMN 2
Number of Persons of Each Sex	Minimum Number of Water Closets and Lavatories for Each Sex
up to 9	1
10 to 24	2
25 to 49	3
50 to 74	4
75 to 100	5
over 100	6 plus 1 for each additional increment of 30 persons of each sex in excess of 100

(2) Not more than one water closet to serve both sexes need be provided in a Group F *occupancy* where,

(a) the *occupant load* is not more than 9 persons, or

(b) the total area of the *occupancy*, excluding *basements*, is not more than 300 m^2.

3.7.4.10. Plumbing Fixtures for Mobile Home Facilities

(1) If mobile homes do not have individual plumbing facilities connected to a central water supply and drainage system, a service *building* shall be provided for public use.

(2) The service *building* required by Sentence (1) shall contain,

(a) at least one water closet for each sex if the service *building* facilities serve not more than 10 mobile homes, and

(b) an additional water closet for each sex for each additional 10 mobile homes.

(3) If a service *building* is required by Sentence (1) it shall contain lavatories as required by Sentence 3.7.4.2.(5) and at least,

(a) one laundry tray or similar facility, and

(b) one bathtub or shower for each sex.

3.7.4.11. Safety Glass

(1) Glass, other than safety glass, shall not be used for a shower or bathtub enclosure.

3.7.4.12. Surface Protection

(1) Wall and floor surfaces below the uppermost surfaces of urinals shall be protected from deterioration by impervious and durable material for a distance from the urinal to a point not less than 900 mm from the projected outline of the urinal on to the wall or floor.

(2) Floor surfaces around a water closet shall be protected from deterioration by impervious and durable material for a distance not less than 900 mm from the projected outline of the water closet on to the floor.

3.7.4.13. Floor Drains

(1) A floor drain shall be installed in a washroom containing urinals equipped with automatic flushing devices.

3.7.4.14. Grab Bar Installation

(1) Grab bars that are installed shall resist a minimum load of 1.3 kN applied vertically or horizontally.

3.7.4.15. Privacy

(1) If a room contains not more than 1 water closet, the doorway to the room shall be provided with a full height door that is capable of being locked from the inside.

(2) If a room contains no fewer than 2 water closets or at least 1 water closet and 1 urinal, the room shall be designed so that water closets, urinals and lavatories are not visible from the entrance to the room.

3.7.4.16. Water Temperature Control

(1) A *water distribution system* supplying hot water to *plumbing fixtures* shall conform to the requirements in Subsection 7.6.5.

3.7.4.17. Drinking Water

(1) On every floor where work will be performed and within 100 m of any area where work will be performed, *potable* water shall be provided from,

(a) a fountain with an upward jet,

(b) a tap from a piped water supply, or

(c) a tap from a covered vessel.

3.7.4.18. Pharmacies

(1) Every *pharmacy* shall be provided with a sink with hot and cold *potable* water for washing utensils used in the preparation, service or storage of drugs.

3.7.5. Health Care Facility Systems

3.7.5.1. Electrical Systems

(1) In anaesthetizing locations, electrical systems shall be designed, constructed, installed and tested in conformance with CSA Z32, "Essential Electrical Systems in Health Care Facilities".

3.7.5.2. Medical Gas Piping

(1) All medical gas piping systems shall be designed, constructed, installed and tested in conformance with CAN/CSA-Z305.1, "Nonflammable Medical Gas Piping Systems".

3.7.5.3. Shielding of X-Ray Equipment

(1) Every installation of an *x-ray machine* or of *x-ray equipment* in a *building* shall be shielded to protect any person who could be exposed to radiation inside and outside the *building*.

3.7.6. Food Premises

3.7.6.1. Application

(1) The requirements of this Subsection apply to all *food premises*.

3.7.6.2. Room Finishes

(1) Except as provided in Sentence (2), floors and floor coverings shall be tight, smooth and non-absorbent in rooms where,

(a) food or drink for human consumption, or an ingredient of food or drink for human consumption, is manufactured, processed, prepared, stored, displayed, handled, served, distributed, sold or offered for sale,

(b) utensils are washed, or

(c) washing *fixtures* or toilet *fixtures* are located.

(2) Carpeting may be used in areas where food is served.

(3) Wall and ceiling finishes of rooms and passageways shall be easy to clean.

3.7.6.3. Location of Plumbing Fixtures

(1) A room containing a water closet shall be located where,

(a) it does not open directly into any room or area where food or drink for human consumption, or an ingredient of food or drink for human consumption, is intended to be stored, prepared, processed, distributed, served, sold or offered for sale, and

(b) it is not necessary for the public to go through the food preparation areas to gain access to the *plumbing fixtures*.

(2) Except as permitted in Sentence (3), a room containing *plumbing fixtures* for the public and employees in a restaurant shall be located in the restaurant.

(3) A room containing *plumbing fixtures* for the public in Sentence (2) need not be located in the restaurant if,

(a) the room is located in the *building* containing the restaurant, and

(b) the distance of travel between the restaurant and the room is not more than 45 m.

3.7.6.4. Lavatories, Appliances and Sinks

(1) A separate lavatory for the handwashing of employees shall be constructed in a location convenient for employees in each manufacturing, processing and preparation area.

(2) If equipment and facilities for the cleaning and sanitizing of utensils are provided, they shall consist of,

(a) mechanical equipment, or

(b) drainage racks of corrosion-resistant materials and,

  (i) a three-compartment sink or three sinks, or

  (ii) a two-compartment sink or two sinks, where the first compartment or sink can be used effectively for washing and rinsing and the second compartment or sink can be used effectively for sanitizing.

(3) A retail *food premises* is exempt from compliance with this Article if its eating and drinking area does not exceed 56 m^2 and any one or more of the following applies:

(a) it is designed to sell only cold drinks in or from the original container,

(b) it is designed to sell only frozen confections in the original package or wrapper,

(c) it is designed to prepare and sell only hot beverages,

(d) it is designed to prepare and sell only popped corn, roasted nuts or french-fried potatoes,

(e) it is designed to sell only food or drink for human consumption that,

  (i) is pre-packaged at a premises other than the *food premises* at which it is being offered for sale, and

  (ii) is not capable of supporting the growth of pathogenic organisms or the production of the toxins of such organisms.

3.7.6.5. Hot and Cold Water Supply

(1) A hot and cold water supply shall be provided to,

(a) every *plumbing appliance* and *fixture* required by Article 3.7.6.4.,

(b) every area where food or drink for human consumption, or an ingredient of food or drink for human consumption, is manufactured, processed or prepared, and

(c) every area where utensils are washed.

(2) This Article does not apply to a retail *food premises* described in Sentence 3.7.6.4.(3).

3.7.6.6. Employee Facilities

(1) In a *food premises*, where dressing rooms are provided for employees, there shall be separate dressing rooms for males and females that,

(a) are large enough for the employees to change and store their clothing, and

(b) are equipped with lockers or other facilities suitable for storing the clothing of the employees.

(2) Every room containing *sanitary units* for employees shall have a floor area not less than 2.3 m^2.

3.7.6.7. Sleeping Quarters

(1) A room or space intended to be used as sleeping quarters shall not open directly into any room where food or drink for human consumption, or an ingredient of food or drink for human consumption, is manufactured, processed, prepared, stored, displayed, handled, served, distributed, sold or offered for sale.

Section 3.8. Barrier-Free Design

3.8.1. General

3.8.1.1. Application

(1) The requirements of this Section apply to all *buildings* except,

(a) houses, including semi-detached houses, duplexes, triplexes, town houses, row houses and boarding or rooming houses with fewer than 8 boarders or roomers,

(b) *buildings* of Group F, Division 1 *major occupancy*, and

(c) *buildings* that are not intended to be occupied on a daily or full time basis, including automatic telephone exchanges, pumphouses and substations.

3.8.1.2. Entrances

(1) In addition to the *barrier-free* entrances required by Sentence (2), the number of *barrier-free* entrances in a *building* referred to in Sentence 3.8.1.1.(1) shall be no fewer than those as specified in Table 3.8.1.2. and shall lead from,

(a) the outdoors at sidewalk level, or

(b) a ramp that conforms to Article 3.8.3.4. and leads from a sidewalk.

(2) A *suite* of *assembly occupancy, business and personal services occupancy* or *mercantile occupancy* that is located in the *first storey* of a *building* or in a *storey* to which a *barrier-free* path of travel is provided, and that is separated from the remainder of the *building*, so that there is no access to the remainder of the *building*, shall have at least one *barrier-free* entrance.

Table 3.8.1.2.
Minimum Number of Pedestrian Entrances Required to be Barrier-Free

Forming Part of Sentence 3.8.1.2.(1)

COLUMN 1	COLUMN 2
Number of pedestrian entrances into *building*	Minimum number of pedestrian entrances required to be *barrier-free*
1 to 3	1
more than 3 to 5	2
more than 5	not less than 50 percent

(3) A *barrier-free* entrance required by Sentences (1) or (2) shall be designed in accordance with Article 3.8.3.3.

(4) At a *barrier-free* entrance that includes more than one doorway, only one of the doorways is required to be designed in accordance with the requirements of Article 3.8.3.3.

(5) If a *walkway* or pedestrian bridge connects two *barrier-free storeys* in different *buildings*, the path of travel from one *storey* to the other *storey* by means of the *walkway* or bridge shall be *barrier-free*.

3.8.1.3. Barrier-Free Path of Travel

(1) Except as required in Sentence (4) and except as permitted in Subsection 3.8.3., every *barrier-free* path of travel shall provide an unobstructed width of at least 1 100 mm for the passage of wheelchairs.

(2) Interior and exterior walking surfaces that are within a *barrier-free* path of travel shall,

(a) have no opening that will permit the passage of a sphere more than 13 mm in diam,

(b) have any elongated openings oriented approximately perpendicular to the direction of travel,

(c) be stable, firm and slip-resistant,

(d) be bevelled at a maximum slope of 1 in 2 at changes in level not more than 13 mm, and

(e) be provided with sloped floors or ramps at changes in level more than 13 mm.

(3) A *barrier-free* path of travel is permitted to include ramps, passenger elevators or other platform equipped passenger elevating devices to overcome a difference in level.

(4) Every *barrier-free* path of travel less than 1 600 mm in width shall be provided with an unobstructed space not less than 1 600 mm in width and 1 600 mm in length located not more than 30 m apart.

(5) Where the headroom of an area in a *barrier-free* path of travel is reduced to less than 1 980 mm, a guardrail or other barrier with its leading edge at or below 680 mm from the floor shall be provided.

3.8.1.4. Access to Storeys Served by Escalators and Moving Walks

(1) In a *building* in which an escalator or inclined moving walk provides access to any floor level above or below the entrance floor level, an interior *barrier-free* path of travel shall be provided to that floor level.

(2) The route from the escalator or inclined moving walk to the *barrier-free* path of travel that leads from floor to floor required by Sentence (1) shall be clearly indicated by appropriate signs.

3.8.1.5. Controls

(1) Except as required by Sentences 3.5.2.2.(1) and 3.8.3.5.(1) for elevators and Sentence 3.8.3.3.(17) for power door operator controls, controls for the operation of *building* services or safety devices, including electrical switches, thermostats and intercom switches, intended to be operated by the occupant and located in a *barrier-free* path of travel shall be accessible to a person in a wheelchair, operable with one hand and mounted at not less than 900 mm and not more than 1 200 mm above the floor.

(2) A signal intended for the public to indicate the operation of a *building* security system that controls access to a *building* shall consist of an audible and visual signal.

3.8.1.6. Illumination

(1) All portions of a *barrier-free* path of travel shall be equipped to provide a level of illumination in accordance with Sentence 3.2.7.1.(1).

3.8.2. Occupancy Requirements

3.8.2.1. Areas Requiring Barrier-Free Path of Travel

(1) Except as permitted by Sentence (2), a *barrier-free* path of travel from the entrances required by Sentences 3.8.1.2.(1) and (2) to be *barrier-free* shall be provided throughout the entrance *storey* and within all other normally occupied *floor areas* served by a passenger elevator, escalator, inclined moving walk, or other platform equipped passenger elevating device.

(2) The provision of a *barrier-free* path of travel in Sentence (1) does not apply,

(a) to *service rooms*,

(b) to elevator machine rooms,

(c) to janitors rooms,

(d) to *service spaces*,

(e) to crawl spaces,

(f) to *attic or roof spaces*,

(g) to floor levels not served by a passenger elevator, a platform-equipped passenger-elevating device, an escalator, or an inclined moving walk,

(h) to *high hazard industrial occupancies*,

(i) within portions of a *floor area* with fixed seats in an *assembly occupancy* where these portions are not part of the *barrier-free* path of travel to spaces designated for wheelchair use,

(j) into *suites* of *residential occupancy* that are in *storeys* other than the entrance *storey* and that have all entrance doors at floor levels that do not correspond to elevator stop levels,

(k) except as required by Sentence (4) within a *suite* of *residential occupancy*, or

(l) within those parts of a *floor area* that are not at the same level as the entry level, provided amenities and uses provided on any raised or sunken level are accessible on the entry level by means of a *barrier-free* path of travel.

(3) The minimum number of spaces designated for wheelchair use in an *assembly occupancy* with fixed seats shall conform to Table 3.8.2.1.

(4) In a Group C *major occupancy* apartment *building*, not less than 10% of all residential *suites* shall be provided with a *barrier-free* path of travel from the *suite* entrance door to,

(a) the doorway to at least one bedroom at the same level, and

(b) the doorway to at least one bathroom,

  (i) having an area not less than 4.5 m^2 at the same level, and

  (ii) conforming to Sentence 9.6.3.3.(1).

Table 3.8.2.1.
Designated Wheelchair Spaces

Forming Part of Sentence 3.8.2.1.(4)

COLUMN 1	COLUMN 2
Number of Fixed Seats in Seating Area	Minimum Number of Spaces Required for Wheelchairs
up to 100	2
101 to 200	3
201 to 300	4
301 to 400	5
401 to 600	6
Over 600	Not less than 1 per cent of the seating capacity

3.8.2.2. Access to Parking Areas

(1) A *barrier-free* path of travel shall be provided from the entrance described in Article 3.8.1.2. to,

(a) an exterior parking area, where exterior parking is provided, and

(b) at least one parking level, where a passenger elevator serves an indoor parking level.

(2) The vehicular entrance to and egress from at least one parking level described in Sentence (1) and all areas intended to be used by wheelchair accessible vehicles to gain access to a parking space on that level shall have a vertical clearance of not less than 2 100 mm.

(3) If an exterior passenger loading zone is provided, it shall have,

(a) an access aisle not less than 1 500 mm wide and 6 m long adjacent and parallel to the vehicle pull-up space,

(b) a curb ramp, where there are curbs between the access aisle and the vehicle pull-up space, and

(c) a clearance height of not less than 2 750 mm at the vehicle pull-up space and along the vehicle access and egress routes.

3.8.2.3. Washrooms Required to be Barrier-Free

(1) Except where other *barrier-free* washrooms are provided on the same floor level within 45 m and except within *suites* of *residential occupancy*, and *buildings* exempted in Clauses 3.8.1.1.(1)(a), (b) and (c), in *buildings* where a washroom is required in accordance with Subsection 3.7.4., a *barrier-free* path of travel shall be provided to a *barrier-free* washroom designed to accommodate disabled persons in conformance with the appropriate requirements in Articles 3.8.3.8. to 3.8.3.12.

(2) Except as permitted in Sentence (3), where washrooms in excess of those required by Subsection 3.7.4. are provided in a *storey* to which a *barrier-free* path of travel is required in conformance with Article 3.8.2.1., these washrooms shall be designed to accommodate disabled persons in conformance with the appropriate requirements in Articles 3.8.3.8. to 3.8.3.12.

(3) Washrooms need not conform to the requirements in Sentence (2) provided,

(a) they are located within *suites* of *residential occupancy*,

(b) other *barrier-free* washrooms are provided on the same floor level within 45 m, or

(c) they are located in an individual *suite* that is,

  (i) used for a *business and personal services occupancy*, a *mercantile occupancy* or an *industrial occupancy*,

  (ii) less than 300 m^2 in area, and

  (iii) completely separated from, and without access to, the remainder of the *building*.

3.8.2.4. Hotels

(1) Except as permitted in Sentence (2), at least 10% of the *suites* of a *hotel* shall,

(a) have a *barrier-free* path of travel extending to the inside of each room, and to a balcony where required by Sentence 3.3.1.7.(2), and

(b) be distributed among *storeys* having a *barrier-free* path of travel.

(2) Not more than 20 *suites* need comply with Sentence (1).

(3) A *suite* having a *barrier-free* path of travel required by Sentence (1) shall have a bathroom that,

(a) conforms to the requirements of Clauses 3.8.3.12.(1)(a) to (i),

(b) has an unobstructed area at least 1 200 mm in diameter extending the full height of the room; however, a door is permitted to open on the inside if it does not reduce the unobstructed area, and

(c) has a bath or shower that conforms to the requirements of Article 3.8.3.13.

3.8.3. Design Standards

3.8.3.1. Accessibility Signs

(1) Where a *building* is required to have a *barrier-free* entrance to accommodate disabled persons, signs incorporating the International Symbol of Accessibility shall be installed where necessary to indicate,

(a) the location of that entrance, and

(b) the location of ramps located in a required *barrier-free* path of travel serving that entrance.

(2) Where a washroom, elevator, telephone or parking area is required to accommodate disabled persons, it shall be identified by a sign consisting of the international symbol of accessibility for disabled persons and such other graphic, tactile or written directions as are needed to indicate clearly the type of facility available.

(3) Where a washroom is not designed to accommodate disabled persons in a *storey* to which a *barrier-free* path of travel is required, signs shall be provided to indicate the location of the *barrier-free* facilities.

(4) Signs incorporating the international symbol of accessibility for disabled persons shall be installed where necessary to indicate the location of the accessible *means of egress*.

(5) Characters, symbols or pictographs on tactile signs shall, if wall mounted, be located not less than 1 200 mm and not more than 1 500 mm above the floor.

3.8.3.2. Exterior Walks

(1) Except as provided in Sentence (2), exterior walks that form part of a *barrier-free* path of travel shall,

(a) be provided by means of a continuous plane not interrupted by steps or abrupt changes in level,

(b) have a permanent, firm and slip-resistant surface,

(c) except as required in Sentence 3.8.1.3.(4), have an uninterrupted width of not less than 1 100 mm and a gradient not exceeding 1 in 20,

(d) be designed as a ramp where the gradient is greater than 1 in 20,

(e) have not less than 1 100 mm wide surface of a different texture to that surrounding it, where the line of travel is level and even with adjacent walking surfaces,

(f) be free from obstructions for the full width of the walk to a minimum height of 1 980 mm, except that handrails are permitted to project not more than 100 mm from either side into the clear area, and

(g) have a level area adjacent to the entrance doorway conforming to Clause 3.8.3.4.(1)(c).

(2) Where a difference in elevation between levels in a walkway is not more than 200 mm, a curb ramp conforming to Sentences (3) and (4) may be provided.

(3) The curb ramp permitted by Sentence (2) shall,

(a) have a running slope conforming to Table 3.8.3.2.,

(b) have a width of not less than 1 200 mm exclusive of flared sides,

(c) have a surface including flared sides that shall,

(i) be slip-resistant,

(ii) have a detectable warning surface that is colour- and texture-contrasted with the adjacent surfaces, and

(iii) have a smooth transition from the ramp and adjacent surfaces, and

(d) have flared sides with a slope of not more than 1:10 where pedestrians are likely to walk across them.

Table 3.8.3.2.
Ramp Rise and Slope

Forming Part of Sentence 3.8.3.2.(3)

COLUMN 1	COLUMN 2
Vertical Rise Between Surfaces, mm	Slope
75 to 200	1:10 to 1:12
less than 75	1:8 to 1:10

(4) Curb ramps described in Sentence (3) do not require handrails or *guards*.

3.8.3.3. Doorways and Doors

(1) Every doorway that is located in a *barrier-free* path of travel shall have a clear width of not less than 850 mm when the door is in the open position.

(2) Except where no bathroom within the *suite* is at the level of the *suite* entrance door to which a *barrier-free* path of travel is provided in accordance with Sentence 3.8.2.1.(1), the doorway to at least 1 bathroom and to each bedroom at the same level as such bathroom within a *suite* of *residential occupancy* shall have, when the door is in the open position, a clear width of not less than,

(a) 760 mm where the door is served by a corridor or space not less than 1 060 mm wide, and

(b) 810 mm where the door is served by a corridor or space less than 1 060 mm wide

(3) Door opening devices that are the only means of operation shall be of a design that does not require tight grasping and twisting of the wrist.

(4) Except as permitted by Sentences (6) and (12), every door that provides a *barrier-free* path of travel through an entrance referred to in Article 3.8.1.2. shall be equipped with a power door operator if the entrance serves,

(a) a *hotel*,

(b) a *building* containing a Group B, Division 2 or 3 *occupancy*, or

(c) a *building* more than 300 m^2 in *building area* containing a Group A, D or E *occupancy*.

(5) Except as permitted by Sentences (6) and (12), where the entrance described in Article 3.8.1.2. incorporates a vestibule, a door leading from the vestibule into the *floor area* shall be equipped with a power door operator in,

(a) a *hotel*,

(b) a *building* of Group B, Division 2 or 3, *occupancy*, and

(c) a *building* more than 300 m^2 in *building area* containing a Group A, D or E *occupancy*.

(6) The requirements in Sentence (4) and (5) do not apply to an individual *suite* having an area of less than 300 m^2 in *buildings* having only *suites* of Group A, D or E *occupancy* where such *suite* is completely cut off from the remainder of the *building*.

(7) Except as permitted in Sentence (8), and except for doors with power operators, closers for doors in a *barrier-free* path of travel shall be designed to permit doors to open when a force of not more than 38 N is applied to the handles, push plates or latch-releasing devices in the case of exterior doors and 22 N in the case of interior doors

(8) Sentence (7) does not apply to doors at the entrances to *dwelling units*, or where greater forces are required in order to close and latch the doors against prevailing differences in air pressures on opposite sides of the doors.

(9) Except for doors at the entrances to *dwelling units*, closers for interior doors in a *barrier-free* path of travel shall have a closing period of not less than 3 seconds measured from when the door is in an open position of 70° to the doorway, to when the door reaches a point 75 mm from the closed position, measured from the leading edge of the latch side of the door.

(10) Unless equipped with a power door operator, a door in a *barrier-free* path of travel shall have a clear space on the latch side extending the height of the doorway and not less than,

(a) 600 mm beyond the edge of the door opening if the door swings toward the approach side, and

(b) 300 mm beyond the edge of the door opening if the door swings away from the approach side.

(11) Vestibules located in a *barrier-free* path of travel shall be arranged to allow the movement of wheelchairs between doors and shall provide a distance between 2 doors in series of at least 1 200 mm plus the width of any door that swings into the space in the path of travel from one door to another.

(12) Only the active leaf in a multiple leaf door in a *barrier-free* path of travel need conform to the requirements of this Article.

(13) Except as provided in Clause 3.8.3.4.(1)(c), the floor surface on each side of a door in a *barrier-free* path of travel shall be level within a rectangular area ,

(a) as wide as the door plus the clearance required on the latch side by Sentence (10), and

(b) whose dimension perpendicular to the closed door is not less than the width of the *barrier-free* path of travel but need not exceed 1 500 mm.

(14) Where a vision panel is provided in a door in a *barrier-free* path of travel, such panel shall be at least 75 mm in width and be located so that,

(a) the bottom of the panel is not more than 900 mm above the finished floor, and

(b) the edge of the panel closest to the latch is not more than 250 mm from the latch side of the door.

(15) A door in a *barrier-free* path of travel consisting of a sheet of glass shall be marked with a continuous opaque strip that,

(a) shall be colour and brightness contrasted to the background of the door,

(b) shall be at least 50 mm wide,

(c) shall be located across the width of the door at a height of 1 350 mm to 1 500 mm above the finished floor, and

(d) may incorporate a logo or symbol provided such logo or symbol does not diminish,

  (i) the opacity of the strip,

  (ii) the width of the strip,

  (iii) the colour and brightness contrast of the strip to the background of the door, and

  (iv) the continuity of the strip across the width of the door.

(16) The power door operator required by Sentences (4) and (5) shall allow persons to activate the opening of the door from either side.

(17) The control for a power door operator required by Sentences (4) and (5) shall,

(a) have no face dimension less than 100 mm,

(b) have its centre located not less than 1000 mm and not more than 1100 mm from the floor level or ground,

(c) be located not less than 600 mm beyond the door swing where the door opens towards the control, and

(d) contain the sign incorporating the International Symbol of Accessibility.

3.8.3.4. Ramps

(1) Ramps located in a *barrier-free* path of travel shall,

(a) have a minimum width of 900 mm between handrails,

(b) have a maximum gradient of 1 in 12,

(c) have a level area of at least 1 670 mm by 1 670 mm at the top and bottom of a ramp and where a door is located in a ramp, so that the level area extends at least 600 mm beyond the latch side of the door opening, except that where the door opens away from the ramp, the area extending beyond the latch side of the door opening may be reduced to 300 mm,

(d) have a level area at least 1 670 mm long and at least the same width as the ramp,

  (i) at intervals of not more than 9 m along its length, and

  (ii) where there is an abrupt change in the direction of the ramp,

(e) except as provided in Sentence (2), be equipped with handrails on both sides that shall,

  (i) be continuously graspable along their entire length and have circular cross-section with an outside diameter not less than 30 mm and not more than 40 mm, or any non-circular shape with a graspable portion that has a perimeter not less than 100 mm and not more than 155 mm and whose largest cross-sectional dimension is not more than 57 mm,

  (ii) be not less than 865 mm and not more than 965 mm high, measured vertically from the surface of the ramp, except that handrails not meeting these requirements are permitted provided they are installed in addition to the required handrail,

  (iii) be terminated in a manner that will not obstruct pedestrian travel or create a hazard,

  (iv) extend horizontally not less than 300 mm beyond the top and bottom of the ramp,

  (v) be provided with a clearance of not less than 40 mm between the handrail and any wall to which it is attached, and

  (vi) be designed and constructed such that handrails and their supports will withstand the loading values obtained from the nonconcurrent application of a concentrated load not less than 0.9 kN applied at any point and in any direction for all handrails and a uniform load not less than 0.7 kN/m applied in any direction to the handrail,

(f) except as provided in Sentence (2), have a wall or a *guard* on both sides and where a *guard* is provided the *guard* shall,

  (i) be not less than 1 070 mm measured vertically to the top of the *guard* from the ramp surface, and

  (ii) be designed so that no member, attachment or opening located between 140 mm and 900 mm above the ramp surface being protected by the *guard* will facilitate climbing, and

(g) be provided,

  (i) with a curb at least 50 mm high on any side of the ramp where no solid enclosure or solid *guard* is provided, and

  (ii) with railings or other barriers that extend to within 50 mm of the finished ramp surface or have a curb not less than 50 mm high.

(2) Where a ramp serves as an aisleway for fixed seating, the requirements for handrails in Clause (1)(e) need not apply.

(3) Floors or walks in a *barrier-free* path of travel having a slope steeper than 1 in 20 shall be designed as ramps.

3.8.3.5. Passenger Elevating Devices

(1) A passenger elevating device referred to in Article 3.8.2.1. shall conform to CAN/CSA-B355, "Lifts for Persons with Physical Disabilities".

3.8.3.6. Spaces in Seating Area

(1) Spaces designated for wheelchair use in Sentence 3.8.2.1.(3) shall be,

(a) clear and level or level with removable seats,

(b) not less than 900 mm wide and 1 525 mm long to permit a wheelchair to enter from a side approach, and 1 220 mm long where the wheelchair enters from the front or rear of the space,

(c) arranged so that at least two designated spaces are side by side,

(d) located adjoining a *barrier-free* path of travel without infringing on egress from any row of seating or any aisle requirements, and

(e) situated, as part of the designated seating plan, to provide a choice of viewing location and a clear view of the event taking place.

3.8.3.7. Assistive Listening Devices

(1) In *buildings* of *assembly occupancy*, all classrooms, auditoria, meeting rooms and *theatres* with an area of more than 100 m^2 and an *occupant load* of more than 75 shall be equipped with assistive listening systems encompassing the entire seating area.

3.8.3.8. Water Closet Stalls

(1) Where a washroom is required by Article 3.8.2.3. to *barrier-free*, at least 1 water closet stall or enclosure shall,

(a) be at least 1 500 mm in width by 1 500 mm in depth,

(b) be equipped with a door that shall,

 (i) be capable of being latched from the inside with a mechanism that is operable by one hand,

 (ii) provide, when the door is in an open position, a clear opening of at least 810 mm,

 (iii) swing outward, unless 760 mm by 1 220 mm clear floor area is provided within the stall or enclosure to permit the door to be closed without interfering with the wheelchair,

 (iv) be provided with spring-type or gravity hinges so that the door closes automatically,

 (v) be provided with a door pull on the outside, near the latch side of the door, and

 (vi) be aligned with the clear manoeuvring space adjacent to the water closet,

(c) have a water closet located so that its centreline is not less than 460 mm and not more than 480 mm from an adjacent side wall on one side,

(d) be equipped with grab bars that shall,

 (i) be at least 760 mm in length and mounted at a 30° to 50° angle sloping upwards, away from the water closet with the lower end of the bar mounted 750 mm to 900 mm above the floor and 50 mm in front of the toilet bowl, or alternatively, be L-shaped with 760 mm long horizontal and vertical components mounted with the horizontal component 750 mm to 900 mm above the floor and the vertical component 150 mm in front of the toilet bowl,

 (ii) be at least 600 mm in length mounted horizontally on the wall behind the water closet from 840 mm to 920 mm above the floor and, where the water closet has a water tank, be mounted 150 mm above the tank,

 (iii) Reserved

 (iv) be installed to resist a load of at least 1.3 kN applied vertically or horizontally,

 (v) be not less than 30 mm and not more than 40 mm in diameter,

 (vi) have a clearance of 30 mm to 40 mm from the wall, and

 (vii) have a slip resistant surface,

(e) be equipped with a coat hook mounted not more than 1 200 mm above the floor on a side wall and projecting not more than 50 mm from the wall,

(f) have a clearance of at least 1 700 mm between the outside of the stall face and the face of an in-swinging washroom door and 1 400 mm between the outside of the stall face and any wall-mounted fixture or other obstruction, and

(g) when a toilet paper dispenser is provided, provide a dispenser that is,

 (i) wall mounted,

 (ii) located below the grab bar,

 (iii) in line with or not more than 300 mm in front of the toilet seat, and

 (iv) not less than 600 mm above the floor.

3.8.3.9. Water Closets

(1) Water closets for a person with physical disabilities shall,

(a) be equipped with a seat located at not less than 400 mm and not more than 460 mm above the floor,

(b) be equipped with hand-operated flushing controls that are easily accessible to a wheelchair user or be automatically operable,

(c) be equipped with a back support where there is no seat lid or tank, and

(d) not have a spring-activated seat.

3.8.3.10. Reserved

3.8.3.11. Lavatories

(1) A barrier-free washroom shall be provided with a lavatory that shall,

(a) be located so that the distance between the centreline of the lavatory and the side wall is not less than 460 mm,

(b) be mounted so that the top of the lavatory or, where the lavatory is in a vanity, the top of the vanity is not more than 840 mm above the finished floor,

(c) have a clearance beneath the lavatory not less than,

(i) 760 mm wide,

(ii) 735 mm high at the front edge,

(iii) 685 mm high at a point 205 mm back from the front edge, and

(iv) 230 mm high over the distance from a point 280 mm to a point 430 mm back from the front edge,

(d) have insulated pipes where they would otherwise present a burn hazard or have water supply temperature limited to a maximum of 43°C,

(e) be equipped with faucet handles of the lever type without spring loading or be automatically operable and are located so that the distance from the centreline of the faucet to the edge of the basin or, where the basin is mounted in a vanity, to the front edge of the vanity, is not more than 485 mm, and

(f) have soap dispensers that are,

(i) located to be accessible to persons in wheelchairs,

(ii) located so that the dispensing height is not more than 1 200 mm above the floor, and

(iii) operable with one hand.

(g) have towel dispensers or other hand drying equipment that are,

(i) located to be accessible to persons in wheelchairs,

(ii) located so that the dispensing height is not more than 1 200 mm above the floor, and

(iii) operable with one hand.

(2) If mirrors are provided in a *barrier-free* washroom, at least one mirror shall be,

(a) mounted with its bottom edge not more than 1 000 mm above the floor, or

(b) inclined to the vertical to be usable by a person in a wheelchair.

(3) If dispensing or hand-operated washroom accessories, except those located in toilet stalls or described in Clause (1)(f), are provided, they shall be mounted so that the dispensing height is between 900 mm and 1 200 mm above the floor.

3.8.3.12. Universal Toilet Rooms

(1) A universal toilet room shall,

(a) be served by a *barrier-free* path of travel,

(b) have a door capable of being locked from the inside and released from the outside in case of emergency and that has,

(i) a graspable latch-operating mechanism located not less than 900 mm and not more than 1 000 mm above the floor,

(ii) if it is an outward swinging door, a door pull not less than 140 mm long located on the inside so that its midpoint is not less than 200 mm and not more than 300 mm from the hinged side of the door and not less than 900 mm and not more than 1 000 mm above the floor, and

(iii) if it is an outward swinging door, a door closer, spring hinges or gravity hinges, so that the door closes automatically,

(c) have one lavatory conforming to Article 3.8.3.11.,

(d) have one water closet conforming to the requirements of Article 3.8.3.9. and located,

(i) so that its centreline is not less than 460 mm and not more than 480 mm from an adjacent side wall on one side, and

(ii) not less than 1 020 mm to the wall on the other side,

(e) have grab bars conforming to Clause 3.8.3.8.(1)(d),

(f) have no internal dimension between walls that is less than 1 700 mm,

(g) have a coat hook conforming to Clause 3.8.3.8.(1)(e) and a shelf located not more than 1 200 mm above the floor,

(h) be designed to permit a wheelchair to back in alongside the water closet in the space referred to in Subclause (d)(ii),

(i) be designed to permit a wheelchair to turn in an open space not less than 1 500 mm in diameter, not less than 1 500 mm, and.

(j) be provided with a door equipped with a power door operator if the door is equipped with a self-closing device.

(2) The water closet and lavatory provided in the special washroom described in Sentence (1) may be counted as part of the *plumbing fixtures* required for males and females in Subsection 3.7.4.

3.8.3.13. Showers and Bathtubs

(1) Except within a *suite* of *residential occupancy*, if showers are provided in a *building*, at least one shower stall in each group of showers shall be *barrier-free* and shall,

(a) be not less than 1 500 mm wide and 900 mm deep,

(b) have a clear floor space at the entrance to the shower not less than 900 mm deep and the same width as the shower, except that fixtures are permitted to project into that space provided they do not restrict access to the shower,

(c) have a slip-resistant floor surface,

(d) have a bevelled threshold not more than 13 mm higher than the finished floor,

(e) have a hinged seat that is not spring-loaded or a fixed seat that shall be,

(i) not less than 450 mm wide and 400 mm deep,

(ii) mounted approximately 450 mm above the floor, and

(iii) designed to carry a minimum load of 1.3 kN,

(f) have a horizontal grab bar conforming to Subclauses 3.8.3.8.(1)(d)(iv) to (vi) that is,

(i) not less than 900 mm long,

(ii) mounted approximately 850 mm above the floor, and

(iii) located on the wall opposite the entrance to the shower so that not less than 300 mm of its length is at one side of the seat,

(g) have a pressure-equalizing or thermostatic mixing valve controlled by a lever or other device operable with a closed fist from the seated position,

(h) have a hand-held shower head with not less than 1 500 mm of flexible hose located so that it can be reached from the seated position and equipped with a support so that it can operate as a fixed shower head, and

(i) have fully recessed soap holders that can be reached from the seated position.

(2) Individual shower stalls that are provided for use by patients or residents in *buildings* of Group B, Division 2 or 3 *occupancy* shall conform to the requirements of Sentence (1).

(3) Individual bathtubs that are provided for the use of patients or residents in *buildings* of Group B, Division 2 or 3 *occupancy* shall have,

(a) faucet handles of the lever type that are not spring-loaded or be automatically operable,

(b) faucet handles that are located so as to be usable by a person seated in the bathtub, and

(c) unless the bathtub is free-standing, an "L"-shaped grab bar conforming to Subclauses 3.8.3.8.(1)(d)(iv) to (vi) mounted on the wall,

(i) with each leg of the "L" being at least 900 mm long,

(ii) with the legs of the "L" being separated by 90°,

(iii) with the horizontal leg of the "L" being located between 150 mm and 200 mm above and parallel to the rim of the bathtub, and

(iv) with the vertical leg of the "L" being located between 300 mm and 450 mm from the control end of the bathtub.

3.8.3.14. Reserved

3.8.3.15. Shelves or Counters for Telephones

(1) Where built-in shelves or counters are provided for public telephones, they shall be level and shall,

(a) be not less than 350 mm deep, and

(b) have, for each telephone provided, a clear space not less than 250 mm wide having no obstruction within 250 mm above the surface.

(2) The top surface of a section of the shelf or counter described in Sentence (1) serving at least one telephone shall,

(a) be not more than 865 mm from the floor, and

(b) have a knee space not less than 685 mm high.

(3) Where a wall-hung telephone is provided above the shelf or counter section described in Sentence (2), it shall be located so that the receiver and coin slot are not more than 1 200 mm from the floor.

3.8.3.16. Drinking Fountains

(1) Where drinking fountains are provided, at least one shall be *barrier-free* and shall,

(a) have a spout located near the front of the unit not more than 915 mm above the floor, and

(b) be equipped with controls that are easily operated from a wheelchair using one hand with a force of not more than 22 N or be automatically operable.

Section 3.9. Portable Classrooms

3.9.1. Scope

3.9.1.1. Application

(1) Except as provided in this Section, the requirements in this Division apply to portable classrooms.

3.9.1.2. Heating Systems

(1) Heating systems and equipment in a portable classroom shall be designed and installed in accordance with Section 6.2.

3.9.2. Interior Finish

3.9.2.1. Flame-Spread Rating

(1) Interior finish material used on a wall or ceiling of a portable classroom shall have a *flame-spread rating* of 150 or less.

3.9.3. Application

3.9.3.1. Building Areas

(1) A single portable classroom shall be not more than 100 m^2 in *building area*, and not more than 1 *storey* in *building height*.

(2) For the purposes of Subsection 3.2.2., where the horizontal distance between portable classrooms is less than 6 m, a group of portable classrooms may be considered as a single *building* with a *building area* equal to the aggregate area of the portable classrooms.

3.9.3.2. Spatial Separations

(1) The requirements in Subsection 3.2.3. need not be provided between individual portable classrooms where the distance between the classrooms is 6 m or more.

(2) The requirements in Subsection 3.2.3. need not be provided between individual portable classrooms within a group where,

(a) the portable classrooms are in groups where ,

(i) the distance between the classrooms is less than 6 m,

(ii) the number of classrooms in a group is not more than 6, and

(iii) the distance between groups of classrooms is 12 m or more, or

(b) the portable classrooms are in groups where,

(i) the *means of egress* for each classroom within a group is by a common corridor or passageway,

(ii) the number of portable classrooms in a group is not more than 6, and

(iii) the distance between groups of portable classrooms is 12 m or more.

3.9.3.3. Fire Alarm Systems

(1) Except as provided in Sentences (2) and (3), the fire alarm system in the main school *building* shall be extended to the portable classrooms with a separate zone indicator on the annunciator.

(2) The requirements in Sentence (1) need not be provided where there are not more than 12 portables on a site and where,

(a) Reserved

(b) the distance between portable classrooms is less than 6 m and the requirements of Subsection 3.2.3. are applied between the classrooms, or

(c) the portable classrooms are in groups where,

(i) the distance between the classrooms is less than 6 m,

(ii) the number of classrooms in a group does not exceed 6,

(iii) within a group of classrooms, the facing walls have a *fire-resistance rating* of 45 min, rated from inside the classroom, and

(iv) the distance between groups of classrooms is 12 m or more.

(3) The requirements in Sentence (1) need not be provided where the distance between portable classrooms is 6 m or more.

3.9.3.4. Provisions for Fire Fighting

(1) The requirements in Articles 3.2.2.10. and 3.2.5.1. to 3.2.5.7. need not be provided where there are not more than 12 portable classrooms on a site and where,

(a) the distance between portable classrooms is 6 m or more,

(b) the distance between portable classrooms is less than 6 m and the requirements of Subsection 3.2.3. are applied between the classrooms,

(c) the portable classrooms are in groups where,

(i) the distance between the classrooms is less than 6 m,

(ii) the number of classrooms in a group is not more than 6,

(iii) within a group of classrooms, the facing walls have a *fire-resistance rating* of 45 min, rated from inside the classroom, and

(iv) the distance between groups of classrooms is 12 m or more,

(d) the portable classrooms are in groups where,

(i) the distance between the classrooms is less than 6 m,

(ii) the number of classrooms in a group is not more than 6, and

(iii) the distance between groups of classrooms is 12 m or more, or

(e) the portable classrooms are in groups where,

(i) the *means of egress* for each classroom within a group is by a common corridor or passageway,

(ii) the number of classrooms in a group is not more than 6, and

(iii) the distance between groups of classrooms is 12 m or more.

3.9.3.5. Portable Fire Extinguishers

(1) A fire extinguisher, in accordance with Article 3.2.5.17., shall be installed in each portable classroom.

3.9.3.6. Means of Egress

(1) Except as required in Sentence 3.9.3.7.(1), a portable classroom shall be provided with *means of egress* conforming to Sections 3.3. and 3.4.

3.9.3.7. Fuel-Fired Appliances

(1) Where there is only one egress door from a portable classroom, a fuel-fired *appliance* shall be separated from the remainder of the classroom by a *fire separation* with a *fire-resistance rating* of not less than 45 min.

(2) Except as provided in Sentences (3) and (4), if a portable classroom contains a fuel-fired *appliance*, the *appliance* shall be separated from the remainder of the classroom by a *fire separation* having a *fire-resistance rating* not less than,

(a) 1.5 h where the horizontal distance between portable classrooms is 1 500 mm or less, and

(b) 45 min where the horizontal distance between portable classrooms is more than 1 500 mm.

(3) If the horizontal distance between portable classrooms is 6 m or more, a fuel-fired *appliance* need not be separated from the remainder of the classroom by a *fire separation* provided,

(a) there is not more than 1 *appliance* per portable classroom, and

(b) the *appliance* is located not less than 4.5 m from an *egress* doorway or an *exit* from the portable classroom.

(4) Fuel-fired *appliances* with sealed combustion located in a portable classroom are not required to be separated from the remainder of the classroom,

(a) if there are not more than four portable classrooms in a group, and

(b) if the *appliance* is located not less than 4.5 m from an egress doorway or an *exit* from the portable classroom.

3.9.3.8. Washroom Facilities

(1) Washroom facilities need not be provided in a portable classroom where the facilities in the main school *building* comply with the requirements of Subsection 3.7.4. for the total *occupant load* of the main school *building* and the portable classrooms.

3.9.3.9. Barrier-Free Access

(1) The requirements of Section 3.8. for *barrier-free* access need not be provided for a portable classroom provided that the main school *building* complies with the requirements of Section 3.8.

Section 3.10. Self-Service Storage Buildings

3.10.1. Scope

3.10.1.1. Application

(1) Except as provided in this Section, the requirements in this Division apply to *self-service storage buildings*.

3.10.2. Requirements for All Buildings

3.10.2.1. Occupancy Classification

(1) A *self-service storage building*,

(a) shall comply with the requirements for a Group F, Division 2 *major occupancy*, and

(b) shall not contain a Group F, Division 1 *occupancy*.

3.10.2.2. Occupant Load

(1) The requirements based on *occupant load* shall not apply.

3.10.2.3. Structural Fire Protection

(1) Except as provided in Sentence (2) and Sentence 3.10.4.2.(1), the requirements in Subsections 3.2.1. and 3.2.2. shall apply.

(2) The *first storey* shall be subdivided into areas not more than 500 m^2 by a masonry or reinforced concrete *fire separation* having a *fire-resistance rating* not less than 1 h, or it shall be *sprinklered*.

3.10.2.4. Safety Requirements Within Floor Areas

(1) Except as provided in Sentences (2) to (12), the requirements in Section 3.3. shall apply.

(2) A corridor need not be constructed as a *public corridor* where the travel distance, measured from inside the rental space to the nearest *exit*, is not more than 15 m provided that the corridor walls,

(a) are of *noncombustible construction*,

(b) have no openings other than doors and the doors are of solid construction, and

(c) are continuous from the floor to the underside of the floor above, the ceiling or the roof.

(3) Where the *building* is *sprinklered*, doors in a *public corridor* do not require to be equipped with self-closing devices and latches provided that the travel distance is measured from inside the rental space to the nearest *exit*.

(4) Egress doors from a rental space are not required to swing in the direction of *exit* travel or swing on a vertical axis provided,

(a) the area of the rental space is not more than 50 m^2, and

(b) the distance of travel within the rental space is not more than 10 m.

(5) Where egress doors from a rental space open onto a corridor and swing in the direction of *exit* travel, the corridor shall be not less than 1 500 mm wide, and the doors shall be not more than 914 mm wide.

(6) Where egress doors from a rental space open onto a corridor and do not swing in the direction of *exit* travel, the corridor shall be not less than 1 100 mm in width.

(7) Dead end corridors are not permitted.

(8) Corridors shall be provided with,

(a) natural lighting that shall be uniformly distributed and be at least 4% of the corridor area, or

(b) emergency lighting, conforming to Sentences 3.2.7.4.(1) and (2), that shall provide average levels of illumination not less than 10 lx at floor level.

(9) Not more than two *dwelling units* shall be contained within one of the *buildings* on the property.

(10) *Dwelling units* shall be separated from the remainder of the *building* by a *fire separation* having a *fire-resistance rating* not less than 2 h.

(11) A *fire separation* is not required between a *dwelling unit* and an office where the office is not more than 50 m^2 in area.

(12) The *fire separations* required in Sentence 3.3.1.1.(1) need not be provided between individual rental spaces.

3.10.2.5. Exit Requirements

(1) Except as provided in Sentences (2) and (3), the requirements in Section 3.4. shall apply.

(2) The clear width of an *exit* stair shall be not less than 1 100 mm.

(3) *Exit* doors from rental spaces are not required to swing on a vertical axis provided,

(a) the area of the rental space is not more than 50 m^2, and

(b) the travel distance within the rental space is not more than 10 m.

3.10.2.6. Service Facilities

(1) Except as provided in Sentence (2), the requirements in Section 3.6. shall apply.

(2) Except where located in and serving only the *dwelling units*, a fuel-fired *appliance* shall be located in a *service room* separated from the remainder of the *building* by a *fire separation* having a *fire-resistance rating* not less than 1 h.

3.10.2.7. Sanitary Facilities

(1) Except as provided in Sentence (2), the requirements in Subsection 3.7.4. shall apply.

(2) Except as permitted in Sentences 3.7.4.1.(2) and (3), two washrooms, each containing a water closet and a lavatory, shall be provided within one of the *buildings* on the property.

3.10.3. Additional Requirements for Buildings Containing more than 1 Storey

3.10.3.1. Application

(1) The requirements in this Subsection apply to all *buildings* except a 1 *storey building* that does not contain a *basement* or *mezzanine*.

3.10.3.2. Spatial Separations

(1) Except as provided in Sentence (2), the requirements in Subsection 3.2.3. shall apply.

(2) The distance between *buildings* shall be not less than 9 m.

3.10.3.3. Fire Alarm Systems

(1) Except as provided in Sentences (2) and (3), the requirements in Subsection 3.2.4. shall apply.

(2) A fire alarm system shall be installed.

(3) Within the *first storey*, manual pull stations are required only in corridors.

3.10.3.4. Provisions for Fire Fighting

(1) Except as provided in Sentences (2) to (4), the requirements in Subsection 3.2.5. shall apply.

(2) Access routes for fire department vehicles shall be provided and shall be not less than 9 m wide.

(3) Hydrants shall be located in the access routes required in Sentence (2) so that,

(a) for a *building* provided with a fire department connection for a standpipe system or a sprinkler system,

(i) a fire department pumper vehicle can be located adjacent to a hydrant, and

(ii) the unobstructed path of travel for the firefighter from the vehicle to the fire department connection is not more than 45 m, and

(b) for a *building* that is not *sprinklered*, a fire department pumper vehicle can be located in the access route so that the unobstructed path of travel for the firefighter is not more than,

(i) 45 m from the hydrant to the vehicle, and

(ii) 45 m from the vehicle to every opening in the *building*.

3.10.3.5. Standpipe Systems

(1) Except as provided in Sentence (2), the requirements in Subsection 3.2.9. shall apply.

(2) Hose stations are not required in the *first storey*.

3.10.4. Additional Requirements for 1 Storey Buildings

3.10.4.1. Application

(1) The requirements in this Subsection apply to 1 *storey buildings* that do not contain a *basement* or *mezzanine*.

3.10.4.2. Building Area

(1) For the purposes of Subsection 3.2.2., *building area* means,

(a) the *building area* of each *building*,

(b) the total of the *building areas* of all *buildings* as a group, or

(c) the total of the *building areas* of any number or group of *buildings*.

3.10.4.3. Spatial Separations

(1) Except as provided in Sentences (2) to (4), the requirements in Subsection 3.2.3. shall apply.

(2) Where the *building area* conforms to Clause 3.10.4.2.(1)(b), the *limiting distance* requirements shall not apply between individual *buildings*.

(3) Where the *building area* conforms to Clause 3.10.4.2.(1)(c),

(a) the *limiting distance* requirements shall apply between each group of *buildings*, but not between individual *buildings* within a group, and

(b) the distance between each group of *buildings* shall be not less than 9 m.

(4) The distance between individual *buildings* within a group shall be not less than 6 m.

3.10.4.4. Fire Alarm Systems

(1) Except as provided in Sentence (2), the requirements in Subsection 3.2.4. shall not apply.

(2) The requirements for *smoke alarms* in Article 3.2.4.21. shall apply to a *dwelling unit*.

3.10.4.5. Provisions for Fire Fighting

(1) Except as provided in Sentences (2) to (7), the requirements in Subsection 3.2.5. shall not apply.

(2) Access routes for fire department vehicles shall be provided and shall be not less than 9 m wide.

(3) Hydrants shall be located in the access routes required in Sentence (2) so that the locations conform to Sentence 3.10.3.4.(3).

(4) The access routes required in Sentence (2) shall conform to the requirements in Sentence 3.2.5.6.(1).

(5) An adequate water supply for fire fighting shall be provided for every *building*.

(6) Where a sprinkler system is installed, the system shall conform to the requirements in Articles 3.2.5.13., 3.2.5.16. and 3.2.5.18.

(7) Where *combustible* sprinkler piping is installed, it shall conform to the requirements in Article 3.2.5.14.

Section 3.11. Public Pools

3.11.1. General

3.11.1.1. Application

(1) This Section applies to every *public pool*.

(2) This Section applies to the design and construction of site assembled and manufactured pools that are intended for use as *public pools*.

(3) Where material alterations to a *public pool* or the equipment installed in a *public pool* affect the bottom slope, the water volume or the capacity of the *recirculation system*, the adversely affected portions shall comply with the requirements of this Division.

(4) Where material alterations or repairs concern any pool fitting passing water and/or air in or out of the pool tank, the affected fitting shall comply with Sentences 3.11.8.1.(14) to (20).

3.11.2. Designations of Public Pools

3.11.2.1. Pool Designations

(1) Every *public pool* shall be designated as being either a Class A pool or a Class B pool in accordance with Sentence (2) or (3).

(2) A Class A pool is a *public pool* to which the general public is admitted or that is,

(a) operated in conjunction with or as a part of a program of an educational, instructional, physical fitness or athletic institution or association, supported in whole or in part by public funds or public subscription, or

(b) operated on the premises of a *recreational camp*, for use by campers and their visitors and camp personnel.

(3) A Class B pool is a *public pool* that is,

(a) operated in conjunction with six or more *dwelling units*, *suites*, single family residences, or any combination of them for the use of occupants or residents and their visitors,

(b) operated in conjunction with a mobile home park for the use of residents or occupants and their visitors,

(c) operated on the premises of a *hotel* for the use of its guests and their visitors,

(d) operated on the premises of a *campground* for the use of its tenants and their visitors,

(e) operated in conjunction with a club for the use of its members and their visitors, or

(f) operated in conjunction with an establishment or institution classified in Table 3.1.2.1. as,

  (i) Group B, Division 1, *major occupancy*, or

  (ii) Group B, Division 2 or 3, *major occupancy*, for the use of residents or occupants and their visitors.

3.11.3. Pool and Pool Deck Design and Construction Requirements for all Class A and Class B Pools

3.11.3.1. Construction Requirements

(1) Except as otherwise required in Subsections 3.11.4., 3.11.5., 3.11.6., and 3.11.7. or otherwise exempted in Sentences (2) and (3), Class A pools and Class B pools shall be designed and constructed to comply with Sentences (2) to (25).

(2) Where a Class B pool is constructed for use solely in conjunction with a club, child care facility, *day camp* or establishment or institution for the care of persons who are infirm, aged or in custodial care, the pool shall be exempt from the requirements of Clause (9)(a) and Sentences (13) and (14).

(3) Where a Class B pool is constructed for use solely in conjunction with an establishment or institution for the treatment of persons who are disabled or ill, the pool shall be exempt from the requirements of Sentences (6) and (7), Clause (9)(a) and Sentences (13) and (14).

(4) A *public pool* shall be constructed to have a water depth of not less than 750 mm except for,

(a) a *modified pool*,

(b) a *wave action pool*,

(c) a pool for therapeutic use,

(d) a beach entry ramp, and

(e) a pool described in Sentence 3.11.5.1.(1).

(5) The beach entry ramp permitted in Clause 4(d) shall be protected with permanent barriers between 900 mm to 1 200 mm along the *pool deck* to prevent entry into the pool until the minimum water pool depth is 750 mm.

(6) Except for a *modified pool*, a *wave action pool* and a pool used exclusively for scuba diving, the slope of the bottom of any portion of a *public pool* shall not exceed,

(a) 8% where the water depth is 1 350 mm or less,

(b) 33% where the water depth is more than 1 350 mm and less than 2 000 mm, and

(c) 50% where the water depth is 2 000 mm or more.

(7) Except for a *modified pool* and *wave action pool*, where the slope of any portion of the bottom of a *public pool* is more than 8%, the walls of the pool shall be equipped with recessed fittings to which a safety line supported by buoys can be attached across the surface of the water and the recessed fittings shall be installed at a horizontal distance of at least 300 mm measured from the vertical projection of the top of the slope in the direction of the shallow end of the pool.

(8) Except for a *modified pool*, *wave action pool* and a pool described in Sentence 3.11.5.1.(1), the side and end walls of a *public pool* shall be vertical from the top of the walls to within 150 mm of the bottom except at steps or recessed ladders or in water depths of 1 350 mm or more.

(9) Except for a *modified pool* and *wave action pool* and except as provided in Sentence (11), a *public pool* shall be surrounded by a hard-surfaced *pool deck* that shall,

(a) except for a pool described in Sentence 3.11.5.1.(1), be not less than 1 800 mm wide and provide at least 900 mm width of clear passage,

(i) behind any *diving board* and its supporting structure, and

(ii) between any column piercing the deck and the edge of the pool or between the column and outer perimeter of the *pool deck*,

(b) in the case of an *outdoor pool*, be sloped away from the pool to waste drains or to adjacent lower ground at a slope of between 2% and 4%, and

(c) in the case of an *indoor pool*, be impervious and sloped away from the pool to waste drains at a slope of between 1% and 4%.

(10) Where a *public pool* is constructed with a ledge, the ledge shall,

(a) be placed only in parts of the pool where the water depth is 1 350 mm or more,

(b) be not more than 200 mm wide,

(c) be at least 1 000 mm below the water surface,

(d) where located on the side of the pool, be gradually tapered towards the shallow end of the pool in such a manner as to prevent a harmful obstruction, and

(e) have a band of contrasting colour along the entire juncture of the side and top of the ledge.

(11) Notwithstanding Sentences (12) to (16), where a *public pool* is constructed on any level surface with walls rising above that surface and has a constant water depth not exceeding 1 100 mm and a water surface area not exceeding 100 m^2, the *pool deck* may be an elevated platform surrounding the pool if it has,

(a) an unobstructed width of not less than 900 mm,

(b) a height of at least 75 mm above grade or pavement elevation,

(c) 6 mm wide openings for drainage, and

(d) a non-slip surface that is capable of being kept clean and disinfected.

(12) Except for a *modified pool* and *wave action pool*, where a *pool deck* projects over the water surface, the projection shall not exceed 50 mm.

(13) Except for a *modified pool* and *wave action pool*, the *pool deck* shall be separated from any adjacent spectator area or gallery and from any spectator access to such area or gallery by a gate or other barrier.

(14) Except for a *modified pool* and *wave action pool*, the perimeter of the *pool deck* shall be clearly delineated by painted lines or other means where any area contiguous to the *pool deck* may be confused with the deck.

(15) Perimeter drainage shall be provided where necessary to prevent surface run-off from draining onto the *pool deck*.

(16) Except for a *modified pool*, one or more hose bibs shall be installed near the perimeter of the *pool deck* in locations convenient for flushing the *pool deck*.

(17) Except for a *modified pool* and *wave action pool*, where access to the pool enclosure is over any surface that is not subject to regular cleaning and sanitizing, a foot spray to wash feet by means of a spray running freely to waste shall be provided at each such access.

(18) Except for a *modified pool* and *wave action pool*, at least one ladder or set of steps shall be provided in both the deep and shallow areas of a *public pool* for entry into and egress from the pool water.

(19) The *pool deck*, the submerged parts of a *public pool*, the walls or partitions adjacent to a *pool deck* and the pavement or floor adjacent to a *pool deck* shall have surfaces that permit thorough cleaning.

(20) Except for markings for safety or competition purposes, submerged surfaces in *public pools* shall be finished white or light in colour.

(21) Except in a *modified pool*, a black disc 150 mm in diameter on a white background shall be affixed to the bottom of a *public pool* within the area of its greatest depth.

(22) A *public pool* shall be equipped with lockable doors or other barriers capable of preventing public access to the *pool deck*.

(23) Except for a *modified pool*, *wave action pool* or a pool installed at a *recreational camp*, a Class A pool shall be provided with,

(a) where the water surface area is greater than 150 m^2 but not greater than 230 m^2, at least one lifeguard control station, and

(b) where the water surface area is greater than 230 m^2, at least two lifeguard control stations.

(24) Except for a *modified pool*, every *public pool* shall display on the deck clearly marked figures, not less than 100 mm high, that set out,

(a) the water depths indicating the deep points, the breaks between gentle and steep bottom slopes and the shallow points,

(b) the words **SHALLOW AREA** at one or more appropriate locations, and

(c) where the water depth exceeds 2 500 mm, the words **DEEP AREA** at one or more appropriate locations.

(25) Except for a *modified pool* and a pool to which Sentence 3.11.5.1.(4) applies, every *public pool* having a maximum water depth of 2 500 mm or less shall display a warning notice posted in a location clearly visible to divers on which is printed in letters at least 150 mm high, the words **CAUTION — AVOID DEEP DIVES** or **SHALLOW WATER — NO DIVING**.

(26) Except where no space is provided between ladder treads and the pool wall, the space between the pool wall and submerged portions of any treads of a ladder for entry into and egress from the water shall be not more than 150 mm and not less than 75 mm.

3.11.4. Public Pools Equipped with Diving Boards or Diving Platforms

3.11.4.1. Diving Boards or Platforms

(1) No *diving board* or *diving platform* shall be installed in a *public pool* unless the requirements of Sentences (5) to (17) are met but the requirements for a *diving platform* do not apply to a *starting platform*.

(2) No *diving board* or *diving platform* shall be installed in a *modified pool* or a *wave action pool*.

(3) Where a *public pool* is equipped with a *diving board* or a *diving platform*, the board or platform shall have a non-slip surface.

(4) Where a *diving board* or a *diving platform* in a *public pool* is more than 600 mmm above the water surface, the board or platform shall be equipped with one or more adjacent handrails.

(5) Where a *public pool* is equipped with a *diving board* or a *diving platform* not more than 3 m in height above the water surface, the pool shall be designed and constructed in conformance with Sentences (6) to (15).

(6) The depth of water in the area directly below a horizontal semi-circle in front of a *diving board* or *diving platform* having a radius of 3 m measured from any point on the front end of the board or platform shall not be less than,

(a) 2 750 mm, where a board is 600 mm or less in height above the water surface,

(b) 3 m, where a board or platform is greater than 600 mm but not more than 1 000 mm in height above the water surface, and

(c) 3.65 m, where a board or platform is greater than 1 000 mm but not more than 3 m in height above the water surface.

(7) Except as permitted in Sentence (8), the water depth in a *public pool* shall be at least 1 350 mm at the horizontal arc having a radius of 9 m measured from any point on the front end of the *diving board* or *diving platform* and intersecting the vertical projections of the walls of the pool.

(8) Where a Class B pool is equipped with a *diving board* 600 mm or less in height above the water,

(a) the water depth shall be at least 1 350 mm at the horizontal arc having a radius of 7.5 m measured from any point on the front end of the *diving board*, and

(b) a warning notice, on which is printed in letters at least 150 mm high, the words **DANGER — AVOID DEEP OR LONG DIVES**, shall be posted in a location clearly visible to divers.

(9) The slope of the bottom of a *public pool* having a *diving board* or *diving platform* shall not change by more than 17% where the water depth is less than the applicable depth set out in Sentence (6) and greater than the depth set out in Sentence (7) or (8), as applicable.

(10) The horizontal distance between the vertical projection of the centre line of a *diving board* or *diving platform* and the vertical projection of the centre line of another board or platform shall be at least 2 750 mm.

(11) The horizontal distance between the centre line of a *diving board* or *diving platform* and the vertical projection of the closest side or any ledge on the closest side of a *public pool* shall be at least,

(a) 3 m, where a *diving board* or *diving platform* is 1 000 mm or less in height above the water surface, and

(b) 3.6 m, where a *diving board* or *diving platform* is greater than 1 000 mm in height above the water surface.

(12) A *diving board* or a *diving platform* 600 mm or less in height above the water surface shall project over the water a horizontal distance of at least 900 mm from the vertical projection of a pool wall under it.

(13) A *diving board* greater than 600 mm in height above the water surface shall project over the water a horizontal distance of at least 1 500 mm from the vertical projection of the pool wall under it.

(14) A *diving platform* greater than 600 mm in height above the water surface shall project a horizontal distance of at least 1 200 mm from the vertical projection of the pool wall under it.

(15) The space above a *diving board* or *diving platform* shall be unobstructed and shall consist of at least,

(a) a space having a width of 2 500 mm on each side of the centre line of the board or platform, a length equal to the sum of the horizontal distance the board or platform projects over the water plus 3 m, and a height of,

(i) 3.65 m above a *diving board* 3.65 m or less in length,

(ii) 5 m above a *diving board* greater than 3.65 m in length, or

(iii) 3 m above a *diving platform*, and

(b) the space below the planes originating from the front and sides of the uppermost horizontal plane of the space determined under Clause (a) and sloping downwards at 30° from the horizontal.

(16) A *diving board* or *diving platform* greater in height than 3 m above the water surface shall be equipped with a gate, barrier or other device capable of preventing access to the *diving board* or *diving platform*.

(17) Where a *public pool* is to be equipped with *diving boards* or *diving platforms* greater than 3 m in height above the water surface, the design of the *diving boards* or *diving platforms* and the corresponding water depths and clearances shall be in accordance with the "Rules and Laws Governing Swimming, Diving, Water Polo and Synchronized Swimming" published by FINA.

3.11.5. Ramps into Public Pools in Group B, Division 2 or 3, Major Occupancies

3.11.5.1. Ramps into Pools

(1) Notwithstanding Sentences 3.11.3.1.(4) and (7) and Clause 3.11.3.1.(9)(a), where a *public pool* is constructed in a *building* containing a Group B, Division 2 or 3, *major occupancy*, and has a water depth not exceeding 1 500 mm and a water surface area not exceeding 100 m^2, the *pool deck* contiguous to not more than 50 per cent of the total perimeter of the pool may be replaced by one or more ramps that will permit a bather seated in a wheelchair to enter the water with or without the wheelchair.

(2) Where a *public pool* has one or more ramps as described in Sentence (1), the pool shall be designed and constructed to comply with Sentences (3) to (8).

(3) A ramp referred to in Sentence (1) shall have,

(a) a handrail having a height between 800 mm and 900 mm along each side of the ramp and running parallel to the slope of the ramp,

(b) a width of at least 1 100 mm,

(c) a curb or other means to prevent a wheelchair from falling off the side of the ramp,

(d) surface finishes capable of being kept clean, sanitary and free from slipperiness, and

(e) a landing at the bottom at least 1 500 mm in length and the same width as the ramp.

(4) Notwithstanding Sentence 3.11.3.1.(25), a warning notice, on which is printed in letters at least 150 mm high, the words **CAUTION — NO DIVING**, shall be posted conspicuously on each wall or fence line enclosing the pool.

(5) There shall be a curb along the perimeter of the pool except at steps, ladders and ramp entrances.

(6) The curb shall have,

(a) a height of 50 mm,

(b) rounded edges,

(c) a coved base, and

(d) a raised nosing at the top to serve as a fingerhold for a bather in the water.

(7) Where a ramp that is not submerged is adjacent to the pool wall and is used for access to the water, the pool shall be constructed so that,

(a) the landing at the bottom of the ramp is at least 450 mm but not more than 550 mm below the top of the wall separating the ramp from the pool,

(b) the landing is equipped with a floor drain at its lowest point,

(c) the top of the wall between the pool and the ramp is at least 250 mm and not more than 300 mm in width,

(d) the *pool deck* is capable of accommodating a movable barrier separating the deck from the ramp,

(e) the water depth at the landing shall be accurately and clearly marked at the landing in figures at least 100 mm high on the top of the wall separating the pool from the ramp, and

(f) the ramp shall have a slope not exceeding 8%.

(8) Where a submerged ramp is adjacent to the pool wall and is used for access to the water, the pool shall be constructed so that,

(a) the water depth at the bottom of the ramp is at least 600 mm and not greater than 900 mm,

(b) a hard-surfaced area that is at least 750 mm wide is contiguous to the entire length of the part of the submerged ramp that pierces any part of the deck,

(c) the area described in Clause (b) is capable of accommodating a movable barrier that separates the area from the deck,

(d) the finishes in submerged portions of the ramps and curbs are different in colour or shade from each other and from that of the pool walls and bottom, and

(e) the submerged ramp has a slope not exceeding 11%.

3.11.6. Modified Pools

3.11.6.1. Construction Requirements

(1) A *modified pool* is exempt from Sentences (4) to (9), (12), (13), (14), (16), (17), (18), (21), (23), (24) and (25) of Article 3.11.3.1. and Sentence 3.11.8.1.(12).

(2) A *modified pool* shall be designed and constructed to comply with Sentences (3) to (9).

(3) A *modified pool* and its *pool deck* shall be constructed of hard-surfaced material that permits thorough cleaning.

(4) The slope of the bottom of any portion of a *modified pool* shall not exceed 8%.

(5) The depth of the water in any portion of a *modified pool* shall not be more than 1 800 mm.

(6) A *modified pool* shall be surrounded on all sides by a hard-surfaced *pool deck* that shall,

(a) be at least 3 m wide,

(b) have a continuous crest surrounding the pool at least 100 mm above the pool water surface, and

(c) be sloped to shed water from the crest to the outer perimeter of the *pool deck*.

(7) A *modified pool* shall be provided with two or more drain fittings covered with protective grilles with openings having an aggregate area of at least 10 times the internal cross-sectional area of the outlet pipe or pipes connected to the *recirculation system* that is capable of completely draining the pool.

(8) Provision shall be made for lifeguard control stations adjacent to the edge of the water at intervals of not more than 60 m.

(9) The bottom of a *modified pool* shall be marked with continuous black contour lines,

(a) 150 mm wide located where the water depth is 600 mm and

(b) 300 mm wide located where the water depth is 1 200 mm.

3.11.7. Wave Action Pools

3.11.7.1. Construction Requirements

(1) A *wave action pool* is exempt from Sentences (4) to (9), (12) to (14), (17), (18) and (23) of Article 3.11.3.1. and Sentence 3.11.8.1.(12).

(2) A *wave action pool* shall be designed and constructed to comply with Sentences (3) to (11).

(3) The slope of the bottom of any portion of a *wave action pool*,

(a) shall not exceed 8% where the still water depth is less than 1 000 mm, and

(b) shall not exceed 11% where the still water depth is 1 000 mm or more.

(4) The walls of a *wave action pool* shall be vertical from the water surface to within 150 mm of the bottom.

(5) There shall be a hard-surfaced *pool deck* at least 3 m wide immediately adjacent to the pool wall at the shallow end of the pool and at least 1 500 mm wide immediately adjacent to all walls of the pool.

(6) Provision shall be made for two or more lifeguard control stations on each side of the *pool deck* adjacent to which the still water depth exceeds 1 000 mm.

(7) Sets of steps or ladders recessed into pool side walls and having continuous vertical grab bars on each side of them shall be located at intervals of not more than 7.5 m along portions of the pool where the still water depth exceeds 1 000 mm, except that no steps or ladders shall be located within 3 m of the corners at the deep end of the pool.

(8) Except at recessed steps or ladders, the *pool deck* along each side of a *wave action pool* adjacent to which the water depth is 2 300 mm or less shall be equipped with a barrier supported by posts or a wall that,

(a) is 1 000 mm in height,

(b) is located 1 000 mm or less from the side of the pool, and

(c) has warning notices affixed to the barrier or wall at intervals not exceeding 7.5 m signifying clearly that jumping and diving are prohibited along the sides of the pool.

(9) Skimming devices shall be designed and suitably located to remove surface film when no waves are induced in a *wave action pool*.

(10) A system capable of deactivating the wave-making equipment shall be installed with readily accessible push buttons located on the *pool deck* not more than 30 m apart, adjacent to each side and the deep end of the pool.

(11) A *wave action pool* shall be equipped with a first-aid room located within 50 m of the pool.

3.11.8. Recirculation for Public Pools

3.11.8.1. Recirculation Systems

(1) Every *public pool* shall be equipped with a *recirculation system*.

(2) For the purposes of this Subsection, the water in a *public pool* and its *recirculation system* shall be deemed not to be *potable* water.

(3) The water in a *public pool* and its *recirculation system* shall be separated from the *potable* water supply and from the sewer or drainage system into which it drains by *air gaps* or other devices that prevent,

(a) the water in the pool or its *recirculation system* from flowing back into the *potable* water supply, and

(b) the water in the sewer or *drainage system* from flowing back into the pool or its *recirculation system*.

(4) The *recirculation system* of a *public pool* shall be designed, constructed and equipped to comply with Sentences (5) to (20).

(5) The *recirculation system* of a *public pool* shall be capable of filtering, disinfecting and passing through the pool each day a volume of water of at least,

(a) in the case of a Class A pool, other than a *modified pool* or a *wave action pool*, six times the total water volume of the pool,

(b) in the case of a Class B pool, other than a *wave action pool*, four times the total water volume of the pool,

(c) in the case of a *modified pool*, three times the total water volume of the pool, and

(d) in the case of a *wave action pool*, six times the total water volume of the pool.

(6) A *recirculation system* shall be equipped with a flow meter registering the rate of water flow.

(7) All pools shall be provided with automatic *make-up water* devices and provided with water meters to register the volume of all *make-up water* added to a *public pool* or its *recirculation system*.

(8) Equipment shall be installed to continuously disinfect the water in a *public pool* by means of,

(a) a chlorination or hypochlorination system provided with a chemical controller for regulating the dosage of chlorine and capable of providing not less than,

(i) in the case of an *outdoor pool*, other than a *wave action pool*, 300 g of chlorine per day per 10 000 L of total pool capacity,

(ii) in the case of an *indoor pool*, other than a *wave action pool*, 200 g of chlorine per day per 10 000 L of total pool capacity,

(iii) in the case of an outdoor *wave action pool*, 1 200 g of chlorine per day per 10 000 L of total pool capacity, and

(iv) in the case of an indoor *wave action pool*, 800 g of chlorine per day per 10 000 L of total pool capacity, or

(b) a bromination system capable of maintaining in the pool water a total bromine residual of 3 mg/L.

(9) Chlorination equipment for a *public pool* shall contain a mechanism whereby the chlorine feed shall automatically terminate whenever the *recirculation system* ceases to supply *clean water* to the pool.

(10) All exposed *potable* water piping and chlorine piping within a *public pool* water treatment *service room* shall be colour coded by means of,

(a) painting the entire outer surface of the piping, or

(b) coloured bands at least 25 mm in width that are spaced along the piping at intervals of not more than 1 200 mm.

(11) The colour coding referred to in Sentence (10) shall be yellow for chlorine and green for *potable* water.

(12) Except for a *modified pool* and *wave action pool*, a *public pool* shall be equipped with overflow gutters or surface skimmers connected to the *recirculation system* that are capable of removing surface film from the surface of the water and withdrawing each day and discharging to the waste drains up to 15 per cent of the total volume of pool water.

(13) A *public pool* shall be equipped with *clean water* inlets arranged in conjunction with surface skimmers or overflow gutters to provide uniform distribution and circulation of *clean water*.

(14) Except as permitted in Sentence (19), all fittings at or below the water surface that allow water and/or air to be passed to or from the *public pool* shall,

(a) have a maximum opening of 7 mm in one direction, and

(b) be securely held in place by corrosion resistance fastening that require a tool for removal and are galvanically compatible with the fittings and grilles or covers.

(15) Except as provided in Sentence 3.11.6.1.(7) for a *modified pool*, all fittings below the water surface that provide suction or gravity flow in a *public pool* shall,

(a) be provided with a minimum of two suction or gravity outlets interconnected to a full size manifold, and

(b) be separated by a clear distance of not less than 1 200 mm.

(16) Except as provided in Sentence 3.11.6.1.(7) for a *modified pool*, water in all *public pools* shall be capable of being emptied through the pool drains in twelve hours or less.

(17) Except as provided in Sentence 3.11.6.1.(7) for a *modified pool*, openings in suction or gravity fittings shall,

(a) be such that the flow of water does not exceed 0.45 m/s and the velocity is calculated assuming all possible sources of suction flow are present at one time, and

(b) be such that every suction fitting located within 1 000 mm of the water surface, except for skimmers and gutter fittings, contain openings with a minimum aggregate area of 0.2 m^2.

(18) Except for skimmers and gutters, all submerged suction and gravity fittings shall be clearly and permanently marked with a 50 mm wide band in a contrasting colour.

(19) Fittings returning water and/or air to the pool tank that are located within 300 mm of the water surface are permitted to have openings with one dimension more than 7 mm but shall contain no openings more than 25 mm in diameter.

(20) Submerged skimmer equalizer fittings and vacuum fittings are not permitted in *public pools*.

3.11.9. Dressing Rooms, Locker Facilities, and Plumbing Facilities for all Public Pools

3.11.9.1. Dressing Rooms and Sanitary Facilities

(1) Except as otherwise permitted in Sentences (2) and (3), every *public pool* shall be equipped with dressing rooms, locker rooms, shower heads, water closets, urinals, lavatories and drinking fountains that shall be designed, constructed and equipped to comply with Sentences (4) to (14).

(2) Where a Class A pool is installed on the premises of a *recreational camp*, dressing rooms, locker rooms, shower heads, water closets, urinals, lavatories and drinking fountains are not required if,

(a) dressing, water closet and shower facilities are conveniently available for bathers elsewhere on the premises, and

(b) foot sprays are provided in accordance with Sentence 3.11.3.1.(17).

(3) Where a Class B pool is installed, dressing rooms, locker rooms, shower heads, lavatories, water closets, drinking fountains and urinals are not required if,

(a) dressing, water closet and shower facilities are conveniently available elsewhere on the premises for bathers when the pool is open for use, and

(b) foot sprays are provided in accordance with Sentence 3.11.3.1.(17).

(4) The minimum number of water closets, urinals and lavatories shall be determined from Article 3.7.4.3. and Table 3.7.4.3.C. for an *occupant load* based on,

(a) the formula in Sentence 3.1.17.3.(1) for all *public pools*, except a *wave action pool*, or

(b) the formula in Sentence 3.1.17.3.(2) for a *wave action pool*.

(5) A minimum of one shower head shall be provided for every 40 bathers.

(6) Where dressing and locker rooms, water closets and urinals are provided in conjunction with a *public pool*, they shall be located in such a manner that bathers, after using them, shall pass through or by a shower area to reach the *pool deck*.

(7) All shower heads shall be supplied with *potable* water at a pressure of at least 140 kPa.

(8) The shower water system shall have one or more tempering devices capable of being adjusted to ensure that water supplied to shower heads does not exceed 40°C.

(9) Floors in washrooms, shower areas and passageways used by bathers shall slope to waste drains at not less than 1% and shall be of hard surfaced materials that do not become slippery when wet.

(10) Joints between floors and walls shall be coved in areas described in Sentence (9) and in dressing and locker rooms.

(11) Hose bibs shall be provided in safe locations convenient for flushing down the walls and floors in washrooms, shower areas and passageways used by bathers.

(12) *Partitions* or walls shall be provided to ensure privacy of dressing rooms, washrooms and shower areas.

(13) The bottom of interior *partitions* in dressing rooms and washrooms shall be between 250 mm and 350 mm above the floor.

(14) Dressing and locker room floors shall have non-slip surfaces that permit convenient and thorough cleaning and disinfecting.

3.11.10. Emergency Provisions for All Public Pools

3.11.10.1. Lighting and Emergency Provisions

(1) Except as provided in Sentences (2) and (3), rooms and spaces used by the public in conjunction with a *public pool* shall be capable of illumination to levels in compliance with Subsection 3.2.7.

(2) Dressing rooms, locker rooms, shower rooms, washrooms and passageways shall have an illumination level of at least 200 lx at floor level.

(3) An *indoor pool* or an *outdoor pool* that is intended to be open for use after sundown shall be equipped with a lighting system,

(a) that will maintain at any point on the *pool deck* and on the pool water surface an illumination level of at least,

  (i) 200 lx in the case of an *indoor pool*, and

  (ii) 100 lx in the case of an *outdoor pool*, and

(b) that makes the underwater areas of the pool clearly visible from any point on the *pool deck*.

(4) An *outdoor pool* that is intended to be open for use after sundown and an *indoor pool* shall be equipped with an independent emergency lighting system that automatically operates whenever the normal electrical power supply to a *public pool* lighting system fails.

(5) The independent emergency lighting system required in Sentence (4) shall be capable of illuminating the *pool deck*, washroom, shower, locker areas, pool water surface and all means of egress to a level of at least 10 lx.

(6) An emergency power supply for the emergency lighting system required in Sentence (4) shall comply with Sentences 3.2.7.4.(1) and 3.2.7.7.(1) and Article 3.2.7.5.

(7) An emergency telephone directly connected to an emergency service or to the local telephone utility shall be installed adjacent to the *pool deck* of every Class A pool.

(8) A telephone accessible for emergency use shall be installed for every Class B pool within 30 m of the pool.

(9) Every *wave action pool* shall have a public address system that shall be clearly audible in all portions of the pool.

(10) Every *wave action pool* shall have a communication system for the use of persons engaged in supervision or operation of the pool that shall be interconnected with each lifeguard control station, the first-aid room and the bather admission control centre.

(11) The public address system and the communication system described in Sentences (9) and (10) shall be interconnected.

(12) All recirculating pumps used in a *public pool* shall be capable of being deactivated by an emergency stop button clearly labelled and located at,

(a) a Class A pool beside the telephone that is required in Sentence (7), and

(b) a Class B pool on the deck area.

(13) The emergency stop button in Sentence (12) shall when used activate an audible and a visual signal located by the emergency stop.

(14) An emergency sign containing the words **IN THE EVENT OF AN EMERGENCY PUSH EMERGENCY STOP BUTTON AND USE EMERGENCY PHONE, AUDIBLE AND VISUAL SIGNAL WILL ACTIVATE** shall be in letters at least 25 mm high with a 5 mm stroke and posted above the emergency stop button.

3.11.11. Service Rooms and Storage for All Public Pools

3.11.11.1. Service Rooms and Storage Facilities

(1) In addition to the requirements of this Subsection, *service rooms* shall comply with the requirements of Sentences 3.6.2.1.(5), 3.6.2.1.(7) and 3.6.2.1.(8) and Articles 3.5.3.3. and 3.6.2.2.

(2) Where compressed chlorine gas is used as a pool water disinfectant, the cylinders or containers of gas shall be located in a *service room* that,

(a) except as provided in Sentences 3.1.9.4.(3) to (8), is separated from the remainder of the *building* by a 1 h *fire separation* that is substantially gas tight,

(b) is designed for the sole purpose of containing all installed pressurized chlorine gas apparatus and piping and storing all chlorine gas containers or chlorine gas cylinders that are individually secured against toppling,

(c) is located at or above ground level,

(d) is provided with an *exit* door opening to the outdoors,

(e) has screened openings to the outdoors with at least one opening located within 150 mm from the floor and at least one opening located within 150 mm from the ceiling, each opening being 2% of the area of the floor,

(f) is equipped with emergency mechanical ventilation capable of producing at least 30 air changes per hour, taking suction at a maximum of 900 mm above the floor level and discharging at least 2 500 mm above ground level directly to the outdoors, and

(g) contains a platform weigh scale of at least 135 kg capacity for each chlorine cylinder in use.

(3) Storage facilities shall be provided for the safe storage of all chemicals required in pool operations.

(4) The storage facilities shall be ventilated and shall be equipped with a water hose connection and a floor drain.

(5) *Service rooms* and storage facilities, including rooms and facilities that contain electrical or mechanical equipment or chemicals or chemical feeders, shall be equipped with a secure locking device.

Section 3.12. Public Spas

3.12.1. General

3.12.1.1. Application

(1) This Section applies to the design and *construction* of site-assembled *public spas* and factory-built *public spas*.

(2) If material alterations to a *public spa* or the equipment installed in a *public spa* affect the bottom slope, the water volume or the capacity of the water circulation system, the adversely affected portions shall comply with the requirements of this Division.

(3) Except as provided in Sentence (4), if material alterations or repairs concern any pool fitting that passes water or air, or both, in or out of the pool tank, the affected fitting shall comply with Sentences 3.11.8.1.(20) and 3.12.4.1.(4) to (10).

(4) If the material alterations or repairs concern a fitting cover or grille, the affected fitting cover or grille shall comply with Sentences 3.12.4.1.(7) to (10).

(5) For the purposes of this Section, every reference to a *public pool* or a *recirculation system* in a definition in Article 1.4.1.2. of Division A, or a Sentence or Clause in Section 3.11. that is made applicable to *public spas* by this Section, shall be deemed to be a reference to a *public spa* or water circulation system, respectively.

3.12.2. Public Spa and Deck Design and Construction Requirements

3.12.2.1. Construction Requirements

(1) In addition to the requirements of this Subsection, *public spas* shall comply with the requirements of Sentences 3.11.3.1.(13) to (17), (19), (20) and (22) and Clause 3.11.3.1.(24)(a).

(2) A *public spa* shall be constructed to have a water depth of not more than 1 200 mm.

(3) The slope of the bottom of any portion of a *public spa* shall not exceed 8%.

(4) A *public spa* shall be surrounded by a hard-surfaced *pool deck* that,

(a) shall have a minimum clear deck space of not less than 1.8 m at the main entrance point,

(b) shall have a clear deck space of 900 mm on all sides, except as required by Clause (a) and permitted by Sentence (5),

(c) shall be sloped away from the pool to waste drains or to adjacent lower ground at a slope of between 2% and 4%, in the case of an outdoor *public spa*, and

(d) shall be impervious and sloped away from the pool to waste drains at a slope of between 1% and 4%, in the case of an indoor *public spa*.

(5) One section of the hard-surfaced *pool deck* that does not exceed 25% of the perimeter of the *public spa* may have a minimum clear deck space of not more than 300 mm if,

(a) the *public spa* has an area less than 6 m^2, and

(b) the *public spa* has no interior dimension more than 2.5 m.

(6) The maximum depth of water to a seat or bench in a *public spa* shall be 600 mm.

(7) If a set of steps is provided for entry into and egress from the *public spa* water, the steps,

(a) shall be equipped with a handrail,

(b) shall have a non-slip surface, and

(c) shall have a band of contrasting colour along the entire juncture of the side and top of the edges.

(8) Every *public spa* shall be provided with dressing rooms, water closets and shower facilities that are conveniently available on the premises.

(9) Except where no space is provided between ladder treads and the spa wall, the space between the spa wall and submerged portions of any treads of a ladder for entry into and egress from the water shall be not more than 150 mm and not less than 75 mm.

3.12.3. Ramps Into Public Spas

3.12.3.1. Ramps into Spas

(1) Not more than 50% of the total perimeter of a *public spa* may be replaced by one or more ramps that permit a bather seated in a wheelchair to enter the water with or without the wheelchair.

(2) If a *public spa* has one or more ramps described in Sentence (1), the *public spa* shall comply with Sentences 3.11.5.1.(1) to (3) and (5) to (8).

3.12.4. Water Circulation for Public Spas

3.12.4.1. Water Circulation Systems

(1) In addition to the requirements of this Subsection, the water circulation system of a *public spa* shall comply with the requirements of Sentences 3.11.8.1.(2), (3), (6), (7), (9), (10), (11), (13) and (20).

(2) A *public spa* shall be equipped with a water circulation system that is capable of filtering, disinfecting and passing the *public spa* water through the *public spa* with a turnover period of not more than,

(a) 30 minutes for a *public spa* with a volume of water that exceeds 6 m^3,

(b) 20 minutes for a *public spa* with a volume of water that exceeds 4 m^3 but does not exceed 6 m^3, or

(c) 15 minutes for a *public spa* with a volume of water that does not exceed 4 m^3.

(3) If cartridge-type filters are used for a *public spa*, the filters shall be a surface-type that is designed for a maximum flow rate of 0.27 $L/s/m^2$ effective filter area.

(4) Except as provided in Sentence (6), every circulation system in a *public spa* shall be served by a minimum of two suction or gravity outlets,

(a) that are interconnected to a full size manifold, and

(b) except as provided in Sentence (5), that are separated by a clear distance of not less than 900 mm.

(5) If compliance with Clause (4) (b) is impracticable because of dimensional restrictions at the bottom of the *public spa*, the outlets may be located on two different planes of the *public spa* if,

(a) at least one of the outlets through which the *public spa* can be emptied to a full-size manifold is located on the bottom of the *public spa*, and

(b) the bottom of all outlets, other than skimmers, are not more than 75 mm from the floor of the *public spa*.

(6) A circulation system in a factory-built *public spa* may be served by a built-in suction or gravity outlet with multiple openings that are connected to a full-size manifold.

(7) All fittings at or below the water surface that allow water or air or both to be passed to or from the *public spa* shall be securely held in place by corrosion resistant fastening that requires a tool for removal and is galvanically compatible with the fittings and grilles or covers.

(8) Except as provided in Sentence (9), all suction or gravity fittings installed at or below the water line of a *public spa* shall,

(a) have a maximum opening of 7 mm in one direction, and

(b) be designed so that the flow of water through the openings does not exceed 0.45 m/s.

(9) Sentence (8) does not apply to suction and gravity outlets that are equipped with anti-entrapment covers that comply with the requirements of ANSI/ASME A112.19.8M, "Suction Fittings for Use in Swimming Pools, Wading Pools, Spas, Hot Tubs, and Whirlpool Bathtub Appliances".

(10) The calculation of water velocities for the purposes of Clause (8)(b) and Sentences (11) and (12) and the calculation of water flow rates for the purposes of Sentence (9) shall be based on the assumption that all possible sources of suction flow are present at the same time.

(11) The water velocity in a suction pipe shall not exceed 1.8 m/s.

(12) The water velocity in a pressure pipe shall not exceed,

(a) 3.0 m/s for plastic piping, and

(b) 1.8 m/s for copper piping.

(13) Every suction system that serves a *public spa* shall be equipped with a vacuum relief mechanism that shall include,

(a) a vacuum release system,

(b) a vacuum limit system, or

(c) other engineered systems that are designed, constructed and installed to conform to good engineering practice appropriate to the circumstances.

(14) Equipment shall be installed to continuously disinfect the water in a *public spa* by means of a chlorination, hypochlorination or bromination system that is capable of regulating the dosage of chlorine or bromine.

(15) If a two-speed pump is utilized for a *public spa*, the filter and heater shall be sized to accommodate the maximum pump output, without exceeding the manufacturer's design flow rate of the filter element or heater and without by-passing the filter element.

(16) A *public spa* equipped with hydro-massage jet fittings shall be provided with a timing device,

(a) that controls the period of operation of the jet pump, and

(b) that is placed in a location where the user must exit the *public spa* to reset the timer.

(17) A *public spa* water heater shall be equipped with an upper limit cut-off device,

(a) that is independent of the normal *public spa* water temperature thermostat, and

(b) that limits the maximum water temperature of the *public spa* to 40°C.

(18) A *public spa* shall be equipped with a water circulation system that is capable of both completely and partially draining and refilling the *public spa* water.

3.12.5. Emergency Provisions for All Public Spas

3.12.5.1. Lighting and Emergency Provisions

(1) In addition to the requirements of this Subsection, *public spas* shall comply with the requirements of Sentences 3.11.10.1.(1) to (6).

(2) An emergency telephone directly connected to an emergency service or to the local telephone utility shall be installed within 30 m of the *public spa*.

(3) All pumps used in a *public spa* shall be capable of being deactivated by an emergency stop button that is clearly labelled and located within the immediate vicinity of the *public spa*.

(4) The emergency stop button required in Sentence (3),

(a) shall be a switch separate from the *public spa*'s timing device,

(b) shall activate an audible and a visual signal when used, and

(c) shall have an emergency sign conforming to Sentence 3.11.10.1.(14).

(5) If a *public spa* and *public pool* are located in the same room or space, the emergency stop buttons required in Sentences (3) and 3.11.10.1.(12) shall deactivate all pumps serving the *public spa* and *public pool*.

3.12.6. Service Rooms and Storage for All Public Spas

3.12.6.1. Service Rooms and Storage Facilities

(1) *Service rooms* and storage facilities for all *public spas* shall comply with the requirements of Article 3.11.11.1.

Section 3.13. Rapid Transit Stations

3.13.1. Scope and Definitions

3.13.1.1. Scope

(1) Except as provided in this Section the requirements in this Division apply to *rapid transit stations*.

3.13.1.2. Definitions

(1) In this Section:

Ancillary space means the rooms or spaces in the station used only by the transit agency to house or contain operating, maintenance or support equipment and functions, but does not include booths and kiosks used by the transit agency or *service rooms*.

Central supervising station means the operations centre where the transit agency controls and co-ordinates the system-wide movement of passengers and vehicles and from which communication is maintained with supervisory and operating personnel of the transit agency and with participating agencies when required.

Crush load means the total of the seating capacity and the standing capacity of a car where,

(a) the seating capacity is the number of seats in a car, and

(b) the standing capacity is 0.2 m^2 per person for the standing area which is measured 300 mm in front of the seats.

Egress capacity means the number of people able to travel from or through a type of egress facility in a specified period of time.

Entraining load means the number of passengers boarding the train at a station.

Fare-paid area means that portion of a *rapid transit station* to which access is gained by a pass or by paying a fare.

Fare-paid area control means the point where passengers enter or leave the *fare-paid area*.

Link load means the number of passengers on board the train(s) travelling between two stations.

Maximum calculated train load means the *crush load* per car multiplied by the maximum number of cars per train in the peak period.

Peak direction means, for each route, the direction of train travel having the largest passenger flow volume based on the sum of the incoming *link load* plus the *entraining load* per peak hour.

Protected route means that portion of a *means of egress* that starts at the point where passengers would not be vulnerable to exposure from a train fire and that leads to the exterior of the station or through an *exit* to an adjacent *building*.

Public area means the public circulation areas in a *rapid transit station* providing pedestrian access to and from trains.

Rapid transit station means a *building* or part of a *building* used for the purpose of loading and unloading passengers of a *rapid transit system* but does not include open air shelters at street level.

Rapid transit system means an electrified transportation system, utilizing guidance methods involving positive mechanical contact with the fixed way operating on a right-of-way for the mass movement of passengers.

3.13.2. Construction Requirements

3.13.2.1. Requirements for Stations

(1) Except as provided in this Subsection, the requirements in Subsections 3.2.1. and 3.2.2. do not apply to a *rapid transit station*.

(2) The requirements in Sentence (3) shall apply to,

(a) a *rapid transit station* erected entirely below the adjoining finished ground level, and

(b) the underground portion of a *rapid transit station*.

(3) Except as permitted in Sentence (4), an underground station or an underground portion of a station in Sentence (2) shall be of *noncombustible construction*, and,

(a) floor assemblies shall be *fire separations* having a *fire-resistance* rating not less than 2 h,

(b) roof assemblies below ground level, shall have a *fire-resistance rating* not less than 2 h, but a *fire-resistance rating* is not required where steel tunnel liners are left in place to form part of the assembly and the tunnel liners are in direct contact with *soil*, and

(c) all *loadbearing* walls, columns and arches shall have a *fire-resistance* rating not less than that required for the supported assembly.

(4) An interior stair extending to street level is permitted to be protected by a *combustible* roof.

(5) Where a *rapid transit station* is erected above and below the adjoining finished ground level, the above ground portion of the station shall be of *noncombustible construction* and shall conform to the requirements in Sentence (10).

(6) Where a *rapid transit station* is erected entirely above the adjoining finished ground level and is a stand-alone *building*, the station shall be of *noncombustible construction* and shall conform to the requirements in Sentence (11).

(7) Openings for stairways and escalators used by passengers are permitted to penetrate the *fire separations* required in Sentences (2) to (6).

(8) Elevator shafts are permitted to penetrate the *fire separations* required in Sentences (2) to (6) provided they are enclosed by,

(a) a *fire separation* having a *fire-resistance rating* not less than 1 h, or

(b) wired glass assemblies conforming to Supplementary Standard SB-2.

(9) Openings for other than stairways, escalators or elevators are permitted to penetrate the *fire separations* required in Sentences (2) to (6) provided the openings are protected by a *closure* having a *fire-protection* rating not less than 45 min.

(10) The *building* shall be of *noncombustible construction* and,

(a) floor assemblies shall be *fire separations* with a *fire-resistance rating* not less than 2 h,

(b) *mezzanines* shall have a *fire-resistance rating* not less 1 h,

(c) roof assemblies shall have a *fire-resistance rating* not less than 1 h, and

(d) all *loadbearing* walls, columns and arches shall have a *fire-resistance rating* not less than that required for the supported assembly.

(11) Except as provided in Sentence (12), the *building* shall be of *noncombustible construction*, and,

(a) floor assemblies shall be *fire separations* with a *fire-resistance rating* not less than 1 h,

(b) *mezzanines* shall have a *fire-resistance rating* not less than 1 h,

(c) roof assemblies shall have a *fire-resistance rating* not less than 1 h, and

(d) all *loadbearing* walls, columns and arches shall have a *fire-resistance rating* not less than that required for the supported assembly.

(12) A *building* classified as Group A, Division 2 *occupancy* that is not more than 1 *storey* in *building height*, and in which the *building area* is not more than 3 200 m^2 if not *sprinklered*, or 6 400 m^2 if *sprinklered*, is permitted to be constructed with a roof of *heavy timber construction* and have columns of *heavy timber construction*.

3.13.3. Safety Requirements Within Stations

3.13.3.1. Application

(1) Except as provided in this Subsection and Subsection 3.13.4., the requirements in Subsections 3.3.1. and 3.6.2. apply to a *rapid transit station*.

(2) A door in a *fire separation* is permitted to be equipped with pivot hinges in conformance with Table 2-8A of NFPA 80, "Fire Doors and Windows".

(3) The requirements in Subsection 3.4.4. for *fire separation* of *exits* do not apply in a *rapid transit station*.

(4) Except as provided in Sentence (5), the requirements in Sentence 3.4.6.15.(1) for doors to be readily opened from the inside apply to required *exit* doors in a *rapid transit station*.

(5) Where a group of two or more doors serves as a single *exit* facility, only one door in the group is required to comply with Sentence 3.4.6.15.(1).

(6) A door that is required to be readily opened in Sentence (4) or (5) shall have a sign attached to it that,

(a) displays the words **EMERGENCY EXIT** with the letters not less than 25 mm high, and

(b) is visible from the *exit* approach.

3.13.3.2. Booths and Kiosks

(1) Booths and kiosks that are not more than 20 m^2 in area and are used only by the transit agency for fare collection, dissemination of information or similar non-*mercantile occupancies* shall be of *noncombustible construction* and are not required to be separated from the remainder of the *floor area* by a *fire separation*.

(2) Booths and kiosks that are more than 20 m^2 in area and are used only by the transit agency for fare collection, dissemination of information or similar non-*mercantile occupancies* shall be,

(a) *sprinklered*, and

(b) separated from the remainder of the *floor area* by a *fire separation* of *noncombustible construction* that is not required to have a *fire-resistance rating*.

(3) A door acting as a *closure* in the *fire separation* in Sentence (2) is not required to be equipped with a self-closing device.

3.13.3.3. Service Rooms and Ancillary Spaces

(1) An *ancillary space* in a *rapid transit station* shall be separated from the remainder of the *floor area* by a *fire separation* having a *fire-resistance rating* not less than 1 h.

(2) Except as provided in Sentence (3), a door opening from a *service room* onto a *means of egress* in a *rapid transit station* shall be located not less than 5 m from an escalator balustrade and from the top and bottom riser of a flight of stairs used as a *means of egress* from the *rapid transit station*.

(3) The requirements in Sentence (2) do not apply where,

(a) the *service room* is *sprinklered*, or

(b) there is a vestibule between the *service room* and the *means of egress*.

(4) Where a door from a *service room* opens onto a *means of egress* less than 5 m wide,

(a) the *service room* shall be *sprinklered*, or

(b) there shall be a vestibule between the *service room* and the *means of egress*.

3.13.3.4. Leased Areas

(1) All leased areas within a *rapid transit station* shall be,

(a) *sprinklered*, and

(b) separated from the remainder of the *floor area* by a *fire separation* of *noncombustible construction* that is not required to have a *fire-resistance rating*.

(2) A door acting as a *closure* in the *fire separation* in Clause (1)(b) is not required to be equipped with a self-closing device.

(3) Where leased areas are located on opposite sides of a *means of egress*, the width of the *means of egress* shall not be reduced to less than 5 m.

(4) Except as provided in Sentence (5), where the leased area on any floor level exceeds 15% of the *public area* on that level, the *public area* shall be *sprinklered*.

(5) In a *rapid transit station* that is erected entirely above the adjoining finished ground level and is a stand-alone *building*, where the leased area on any floor level exceeds 20% of the *public area* on that level, the *public area* shall be *sprinklered*.

(6) In determining the leased area in Sentences (4) and (5), it is not necessary to include a leased area that is separated from the *public area* by a *fire separation* having a *fire-resistance rating* not less than,

(a) 2 h where the leased area contains a *mercantile* or *medium hazard industrial occupancy*, or

(b) 1 h where the leased area contains any other *occupancy*.

(7) A leased area is permitted on a platform level provided it is,

(a) located not less than 5 m from the platform edge,

(b) located not less than 5 m from an egress facility, and

(c) not located in a dead end portion of the platform.

3.13.3.5. Vehicle Terminal

(1) Where an enclosed terminal serves vehicles powered by combustible fuels, and the terminal has direct access to a *rapid transit station*,

(a) the terminal shall be *sprinklered*, and

(b) the terminal shall be separated from the *rapid transit station*,

  (i) by a *fire separation* having a *fire-resistance rating* not less than 1 h, or

  (ii) by wired glass assemblies conforming to Supplementary Standard SB-2 with wired glass doors equipped with self-closing devices.

(2) Doors in the *fire separation* or in the wired glass assembly in Clause (1)(b) are not required to have latches where close spaced sprinkler protection is provided on the station side.

3.13.3.6. Access to Adjacent Building

(1) Where an access is provided between a *rapid transit station* and an adjacent *building*, the station and the *building* shall be separated by a *fire separation* having a *fire-resistance rating* not less than 2 h.

(2) The access in Sentence (1) shall be through a vestibule that is separated from the station and from the *building*,

(a) by a *fire separation* having a *fire-resistance rating* not less than 1 h, or

(b) by wired glass assemblies conforming to Supplementary Standard SB-2 with wired glass doors equipped with self-closing devices.

(3) The vestibule doors in Sentence (2),

(a) are not required to be equipped with latches, and

(b) shall swing in the direction of travel from the *rapid transit station*.

(4) Close spaced sprinkler protection shall be provided on each side of all vestibule doors.

(5) The vestibule shall not contain an *occupancy*.

(6) Where an access is provided between a *rapid transit station* and an adjacent *building*, and the *building* is regulated by the provisions of Subsection 3.2.6. or 3.2.8., these provisions are not required in the *rapid transit station*.

3.13.3.7. Emergency Lighting

(1) Emergency lighting shall be provided to average levels not less than 10 lx at floor or tread level in *public areas* in a *rapid transit station*.

(2) An emergency power supply conforming to Subsection 3.2.7. shall be provided to maintain the emergency lighting required in Sentence (1) for a period of 30 min after a power failure.

3.13.4. Means of Egress

3.13.4.1. Occupant Load

(1) The occupant load for *public areas* within a *rapid transit station* shall be,

(a) determined in conformance with this Subsection, and

(b) based on peak hour patronage as projected for design of the transit system.

(2) The platform occupant load for each platform in a *rapid transit station* shall be the greater of the a.m. or p.m. peak period loads calculated in accordance with Sentences (3) to (5).

(3) The a.m. and the p.m. peak period occupant loads for each platform shall be based on the simultaneous evacuation of the *entraining load* and the *link load* for that platform.

(4) The *entraining load* for each platform shall be the sum of the *entraining loads* for each track serving that platform and the *entraining load* for each track shall be based on the *entraining load* per train headway multiplied by,

(a) a factor of 1.3 to account for surges, and

(b) in the *peak direction* for each route, an additional factor of 2 to account for a missed headway.

(5) The *link load* for each platform shall be the sum of the *link loads* for each track serving that platform and, except as provided in Sentence (6), the *link load* for each track shall be based on the *link load* per train headway multiplied by,

(a) a factor of 1.3 to account for surges, and

(b) in the *peak direction* for each route, an additional factor of 2 to account for a missed headway.

(6) The maximum *link load* at each track shall be the *maximum calculated train load*.

3.13.4.2. General Requirements

(1) Except as provided in Sentence (2), escalators conforming to the requirements of Sentences 3.13.4.5.(3) and 3.13.4.6.(1) shall be acceptable as part of a required *means of egress* in a *rapid transit station*.

(2) Escalators forming part of a required *means of egress* shall not comprise more than one half of the required *egress capacity* from any one level.

(3) *Horizontal exits* conforming to Sentence (4) may provide all of the required *egress capacity* from a *rapid transit station*.

(4) *Horizontal exits* to any one *building* shall not comprise more than one half of the required *egress capacity* from any area within a *rapid transit station*.

(5) A *protected route* shall be provided with emergency ventilation conforming to Subsection 3.13.7.

(6) In an aboveground unenclosed station, the *protected route* is permitted to begin at the point of leaving the platform.

(7) In an enclosed or underground station, the protection for the *protected route* shall consist of,

(a) a *fire separation* having a *fire-resistance rating* not less than 1 h,

(b) construction having a *fire-resistance rating* not less than 1 h, or

(c) wired glass assemblies conforming to Supplementary Standard SB-2.

3.13.4.3. Number and Location of Means of Egress

(1) Each platform in a *rapid transit station* shall be served by no fewer than 2 *means of egress* that are independent of and remote from each other from the platform to the exterior of the station.

(2) Where a continuous level walking surface is provided between two adjacent platforms, they may be considered as one platform for the purpose of conforming to this Subsection.

(3) At the platform level, the distance separating the egress facilities in Sentences (1) and (2) shall be the greater of one car length or 25 m.

(4) Except as required in Sentence (1), two or more *means of egress* are permitted to converge in conformance with Sentence 3.13.4.4.(6).

(5) *Means of egress* from platforms shall be located so that the travel time from the most remote point on a platform to a *protected route* does not exceed 4 min based on travel speeds of,

(a) 38 m/min for horizontal travel, and

(b) 21 m/min for vertical rise.

3.13.4.4. Egress Capacity

(1) For a *rapid transit station*, the required aggregate *egress capacity* from each platform shall be determined by dividing the platform occupant load determined in accordance with Sentences 3.13.4.1.(2) to (6) by the required platform clearance time determined in accordance with Sentence (3).

(2) Where 2 platforms are considered as 1 platform as provided in Sentence 3.13.4.3.(2), the required *egress capacity* for each platform shall be determined separately.

(3) The required platform clearance time shall be 4 min less the travel time between the platform and the entry into the *protected route* based on travel speeds of,

(a) 38 m/min for horizontal travel, and

(b) 21 m/min or vertical rise.

(4) For each *means of egress*, the required *egress capacity* at the platform shall be maintained for the entire length of the *means of egress*.

(5) Except as provided in Sentence (6), where 2 or more *means of egress* converge, the required *egress capacity* beyond that point shall be cumulative.

(6) The *egress capacity* in Sentence (5) need not be cumulative after converging where it can be shown that the platform clearance time in Sentence (3) is not exceeded.

3.13.4.5. Width of Means of Egress

(1) Except as otherwise required in this Subsection, the required width of *means of egress* serving platforms in a *rapid transit station* shall be determined based on,

(a) the required *egress capacity* determined in conformance with Article 3.13.4.4., and

(b) the pedestrian flow rate for the type of *means of egress* facility listed in Table 3.13.4.5.

(2) In calculating the required width of corridors and ramps with a grade of less than 4%, 300 mm at each sidewall shall be added to the width determined based on required *egress capacity*.

(3) In calculating the required width of egress routes, one escalator at each level in a *rapid transit station* shall be deemed to be out of service and not available for egress purposes.

Table 3.13.4.5.
Pedestrian Flow Rates

Forming Part of Sentence 3.13.4.5.(1)

COLUMN 1	COLUMN 2	COLUMN 3
Type of Egress Facility	Flow Rate, pedestrians per minute	Flow Rate, pedestrians per minute per metre width
Platforms	N/A	80
Corridors	N/A	80
Doorways	N/A	80
Gates	N/A	80
Ramps not more than 4%	N/A	80
Ramps more than 4 %	N/A	55(1)
Stairs	N/A	55(1)
Escalators moving in direction of egress travel, nominal width		
: 1 200 mm	100	N/A
: 800 mm	80	N/A
: 600 mm	60	N/A
Turnstiles, height of bar		
: not more than 900 mm	45	N/A
: more than 900 mm	25	N/A

Note to Table 3.13.4.5.:

(1) Flow rate is applied vertically.

(4) Except as provided in Sentence (5), the minimum width of *means of egress* facilities serving platforms shall be,

(a) 1 750 mm for corridors and ramps,

(b) 1 750 mm for stairs,

(c) 430 mm for turnstiles,

(d) 500 mm for fare collection gates,

(e) 600 mm nominal width for escalators, and

(f) 900 mm for a door leaf.

(5) A second *means of egress* as required by Sentence 3.13.4.3.(1) is permitted to be not less than 1 100 mm wide.

(6) The minimum width of platforms shall be,

(a) 3.2 m for side platforms, and

(b) 6.4 m for island platforms.

(7) The minimum unobstructed width of platforms measured from the platform edge shall be 2.5 m.

3.13.4.6. Egress Facilities

(1) Escalators forming part of a required *means of egress* shall,

(a) where equipped to run reverse to the direction of egress travel, be capable of being stopped remotely and locally, and

(b) have a vertical rise not more than 12 m between floors or landings.

(2) Where electrically operated gates or turnstiles used for fare collection are intended to be used as part of a required *means of egress* from a *rapid transit station*, provision shall be made to release the gates or turnstiles in accordance with Sentence (4) to allow them to operate freely in the direction of egress travel.

(3) Where locked doors that prevent entry into a *fare-paid area* are to be used as part of a required *means of egress* from a *rapid transit station*, provision shall be made to release the doors in accordance with Sentence (4) to allow them to operate freely in the direction of egress travel.

(4) The release device required in Sentences (2) and (3) shall be installed as an ancillary device to the fire alarm system and shall release immediately,

(a) upon activation of the fire *alarm signal*,

(b) in the event of a power failure or ground fault, or

(c) upon actuation of a manually operated switch accessible to authorized personnel and located in,

  (i) a fare collector's booth or kiosk at the station, or

  (ii) the *central supervising station*.

(5) After release, the gates or turnstiles in Sentence (2) or the doors in Sentence (3) shall be capable of reactivation only by manual actuation of the switch in Clause (4)(c).

3.13.5. Fire Safety Provisions

3.13.5.1. Fire Alarm System

(1) Except as provided in this Subsection, a fire alarm system conforming to Subsection 3.2.4. shall be installed in a *rapid transit station*.

3.13.5.2. Exceptions

(1) Manual pull stations need not be installed in a *rapid transit station*.

(2) Audible signal appliances need not be installed in a *rapid transit station*.

3.13.5.3. Fire Detectors

(1) Except where the area is *sprinklered*, *fire detectors* shall be installed in every *service room*, *ancillary space*, leased space, booth and kiosk.

3.13.5.4. Central Supervising Station

(1) Each *rapid transit station* shall be monitored by a *central supervising station* conforming to CAN/ULC-S561, "Installation and Services for Fire Signal Receiving Centres and Systems".

3.13.5.5. Annunciators

(1) An annunciator shall be installed,

(a) in a location that is readily accessible to fire fighters entering the *building*, and

(b) in the *rapid transit station*,

  (i) in a designated collector's booth, or

  (ii) within viewing distance of a designated collector's booth.

3.13.5.6. Annunciator Indication

(1) All fire alarm, *fire detectors*, valve switches and water flow indicator signals when activated in a *rapid transit station* shall be indicated on the annunciator at the station.

(2) The annunciator at a *rapid transit station* shall be monitored simultaneously at the *central supervising station*.

(3) Where a *means of egress* from a *rapid transit station* leads through an adjoining *building*, any *alarm signal* originating in the *building* within two *storeys* above a connection to the station shall,

(a) be indicated on the *rapid transit station* annunciator, and

(b) cause a message to flash a warning on a sign located in conformance with Sentence (4), that the *means of egress* shall not be used as an *exit* from the station.

(4) A sign required in Clause (3)(b) shall be located,

(a) at the doors from the *rapid transit station* to the adjoining *building*, and

(b) in the *means of egress* to the adjoining *building*, at the last point where there is a choice of direction to travel to at least one other *exit*.

3.13.5.7. Emergency Power

(1) An emergency power supply conforming to Article 3.2.7.8. shall be provided for the fire alarm system.

3.13.5.8. Communication Systems

(1) In a *rapid transit station*, a public address system shall be installed and shall include loudspeakers that,

(a) can be operated from the *central supervising station*,

(b) can be operated from the *rapid transit station* in which they are located, and

(c) designed and located so that voice messages can be heard intelligibly throughout the *public area* in a *rapid transit station*.

(2) A 2-way communication system shall be installed in each *rapid transit station* with telephones located at,

(a) the collector's booth, and

(b) at each end of each platform.

(3) The telephones in Sentence (2) shall be provided with connections to the *central supervising station*.

3.13.5.9. Emergency Reporting Devices

(1) Emergency reporting devices shall be located on passenger platforms and throughout a *rapid transit station* such that the distance of travel from any point in the *public area* to such a device is not more than 90 m.

(2) The emergency reporting devices required in Sentence (1) are permitted to be public telephones with an emergency no charge capability and their location shall be plainly indicated by appropriate signs.

3.13.5.10. Sprinkler Systems

(1) Sprinkler systems shall conform with the requirements of Articles 3.2.5.13 to 3.2.5.16.

(2) In addition to the requirements of Subsection 3.13.3. the steel truss enclosure of an escalator shall be *sprinklered*.

(3) There shall be identification on a fire department connection for a sprinkler system in a *rapid transit station* to indicate that the connection is part of the station system.

3.13.5.11. Standpipe and Hose Systems

(1) A standpipe and hose system conforming to the requirements of Subsection 3.2.9. shall be installed in a *rapid transit station*, except as otherwise required or permitted in this Article.

(2) Where a *rapid transit station* includes more than one standpipe riser there shall be a cross-connection pipe having a diameter not less than 100 mm between each standpipe riser so that supplying of water through any fire department connection will furnish water throughout each riser.

(3) There shall be identification on a fire department connection for a standpipe system in a *rapid transit station* to indicate that the connection is part of the station system.

(4) Hose stations shall be located so that every portion of the *rapid transit station* can be reached by a hose stream and is within 3 m of a hose nozzle when the hose is extended.

(5) In addition to the requirements in Sentence (4), hose stations shall be located in each tunnel not more than 20 m from the end of the platform.

(6) The requirement for hose rack and fire hose in Sentence 3.2.9.4.(2) does not apply in a *rapid transit station*.

(7) Each hose station shall have a 38 mm hose connection and a 65 mm hose connection.

(8) All supply piping shall have a diameter not less than 100 mm.

3.13.6. Required Sanitary Facilities

3.13.6.1. Application

(1) Except as provided in this Subsection, Subsection 3.7.4. applies to a *rapid transit station*.

3.13.6.2. Washrooms Required

(1) Except as provided in Sentences (2) and (3), a washroom for each sex, containing at least 1 water closet and 1 lavatory, shall be provided in each *rapid transit station* for use by employees.

(2) Where the number of employees in a *rapid transit station* is not more than 5, a washroom containing 1 water closet and 1 lavatory is permitted to be used by both sexes provided the door to the room can be locked from the inside.

(3) Where a *rapid transit station* is not staffed during operating hours, a washroom is not required in the station.

(4) In each *rapid transit station* located at the end of a line, a washroom for each sex, containing no fewer than 3 water closets and 2 lavatories, shall be provided for use by the public.

3.13.7. Emergency Ventilation

3.13.7.1. Application

(1) Every *rapid transit station* shall be provided with an emergency ventilation system conforming to NFPA 130, "Fixed Guideway Transit Systems".

3.13.8. Barrier-Free Design

3.13.8.1. Application

(1) Except as provided in this Subsection, the requirements in Section 3.8. apply to *rapid transit stations*.

(2) At least one *barrier-free* path of travel shall be provided from an entrance described in Article 3.8.1.2.,

(a) into the *fare-paid area*, and

(b) to each platform.

3.13.8.2. Exception

(1) Where an elevator is used to comply with the requirements of Article 3.3.1.7., the provisions of Clause 3.3.1.7.(1)(a) do not apply where the elevator system complies with Article 3.13.8.3.

3.13.8.3. Elevator Requirements

(1) Except as provided in Sentence (2), the elevator in Article 3.13.8.2. shall be capable of providing transportation from each platform to an entrance described in Article 3.8.1.2.

(2) Where it is necessary to change elevators to reach the entrance described in Sentence (1), the elevator system shall be designed so that not more than one change of elevator is required between,

(a) a platform and a *fare-paid area control*, and

(b) the *fare-paid area control* and the entrance.

3.13.8.4. Emergency Operation of Elevators

(1) Manual emergency recall operation shall be provided for all elevators.

(2) Key-operated switches for emergency recall described in Sentence (1) shall be provided and shall be located on the outside of each elevator shaft at the level of the *fare-paid area control*.

(3) In-car emergency service switches shall be provided in all elevator cars.

(4) Keys to operate the switches required in Sentences (2) and (3) shall be located at,

(a) the annunciator required in Clause 3.13.5.5.(1)(a), and

(b) the collector's booth designated in Clause 3.13.5.5.(1)(b).

3.13.8.5. Washrooms Required to be Barrier-Free

(1) A *barrier-free* path of travel shall be provided to the washrooms required in Article 3.13.6.2.

(2) Where a washroom required in Sentence 3.13.6.2.(1) contains only 1 water closet and 1 lavatory, the washroom shall be designed in conformance with the requirements in Article 3.8.3.12.

(3) Where a washroom required in Sentence 3.13.6.2.(1) contains more than 1 water closet, the washroom shall be designed in conformance with the requirements in Articles 3.8.3.8. to 3.8.3.11.

(4) The washroom required in Sentence 3.13.6.2.(2) shall be designed in conformance with the requirements in Article 3.8.3.12.

(5) The washrooms required in Sentence 3.13.6.2.(4) shall be designed in conformance with the requirements in Articles 3.8.3.8. to 3.8.3.11.

Section 3.14. Tents and Air-Supported Structures

3.14.1. Tents

3.14.1.1. Application

(1) Except as provided in this Subsection, tents are exempted from complying with the requirements of this Division.

3.14.1.2. General

(1) Except as provided in Sentence (2), the requirements of this Subsection shall apply to all tents.

(2) Articles 3.14.1.4., 3.14.1.5., 3.14.1.6. and 3.14.1.10. apply to tents that,

(a) do not exceed 225 m^2 in ground area,

(b) do not exceed 225 m^2 in aggregate ground area and are closer than 3 m apart,

(c) do not contain bleachers, and

(d) are not enclosed with sidewalls.

3.14.1.3. Means of Egress

(1) Except as provided in Sentences (2) and (3), tents shall conform to Sections 3.3. and 3.4.

(2) A tent need not conform to Article 3.4.6.11. except where swing type doors are provided.

(3) Where the area between adjacent tents or a tent and the property line is used as a *means of egress*, the minimum width between stake lines shall be the width necessary for *means of egress*, but not less than 3 m.

3.14.1.4. Clearance to Other Structures

(1) Tents shall not be erected closer than 3 m to the property line.

(2) Except as provided in Sentences (3), (4) and (5), tents shall not be erected closer than 3 m to other tents or structures on the same property.

(3) A *walkway* between a *building* and a tent occupied by the public is permitted provided,

(a) the tent is not closer than 3 m from the *building*, and

(b) the *walkway* conforms to Article 3.2.3.19.

(4) Tents not occupied by the public need not be separated from one another, and are permitted to be erected less than 3 m from other structures on the same property, where such closer spacing does not create a hazard to the public.

(5) Tents located on fair grounds or similar open spaces, need not be separated from one another provided such closer spacing does not create a hazard to the public.

3.14.1.5. Clearances to Flammable Material

(1) The ground enclosed by a tent and for not less than 3 m outside of such structure shall be cleared of all flammable or *combustible* material or vegetation that will carry fire.

3.14.1.6. Flame Resistance

(1) Every tent, and tarpaulins, decorative materials, fabrics and films used in connection with tents, shall be certified to CAN/ULC-S109, "Flame Tests of Flame-Resistant Fabrics and Films", or NFPA 701 "Fire Tests for Flame-Resistant Textiles and Films".

3.14.1.7. Bleachers

(1) Where bleachers are provided in tents, they shall be designed in conformance with Articles 3.3.2.8., 3.3.2.10. and Subsection 4.1.5.

3.14.1.8. Sanitary Facilities

(1) Except as provided in Sentence (3), the minimum number of water closets for tents shall be determined in accordance with Table 3.7.4.3.E.

(2) Article 3.7.4.16. applies to sanitary facilities in Sentence (1).

(3) Sanitary privies, chemical closets or other means for the disposal of human waste may be provided in lieu of toilet fixtures.

3.14.1.9. Provision for Fire Fighting

(1) Access shall be provided to all tents for the purpose of fire fighting.

3.14.2. Air-Supported Structures

3.14.2.1. Application

(1) Except as provided in this Subsection, the requirements of this Division apply to *air-supported structures*.

3.14.2.2. General

(1) *Air-supported structures* shall not be used for Groups B, C, or Group F, Division 1 *major occupancies* or for classrooms.

(2) Except where no *fire separation* is required between *major occupancies*, *air-supported structures* shall contain not more than one *major occupancy*.

(3) Except as provided in Sentence (5), *air-supported structures* are exempt from complying with Articles 3.2.2.20. to 3.2.2.83., except for maximum *building* size.

(4) *Air-supported structures* may be designed with interior walls, *mezzanines*, or similar *construction*.

(5) Interior construction contained within *air-supported structures* must meet the construction requirements of Articles 3.2.2.20. to 3.2.2.83.

3.14.2.3. Spatial Separation

(1) Except as provided in Sentences (2), (3) and (4), *air-supported structures* shall not be erected closer than 3 m to other structures on the same property or to the property line.

(2) *Air-supported structures* not occupied by the public need not be separated from one another, and are permitted to be erected closer than 3 m from other structures on the same property where such closer spacing does not create a hazard to the *building* occupants or the public.

(3) Except as provided in Sentence (4), an *air-supported structure* is permitted to be attached to another *building* provided the *building* to which it is attached,

(a) conforms to the requirements of other Parts of this Division based on the total *building areas* of the *air-supported structure* and the attached *building*,

(b) is *sprinklered*, and

(c) is separated from the *air-supported structure* by a *fire separation* having a *fire-resistance rating* of not less than 1 h.

(4) An *air-supported structure* is permitted to be attached to another *building* provided the *building* to which it is attached,

(a) has a *building area* not more than 200 m^2,

(b) conforms to the requirements of other Parts of the Code based on the *building area* of the attached *building*, and

(c) is *sprinklered* or separated from the *air-supported structure* by a *fire separation* having a *fire-resistance rating* of not less than 1 h.

3.14.2.4. Clearances to Flammable Material

(1) The ground enclosed by an *air-supported structure* and for not less than 3 m outside of such structure shall be clear of all flammable or *combustible* material or vegetation that will carry fire.

3.14.2.5. Flame Resistance

(1) *Air-supported structures* shall be constructed of material conforming to CAN/ULC-S109, "Flame Tests of Flame-Resistant Fabrics and Films", or NFPA 701, "Fire Tests for Flame-Resistant Textiles and Films".

(2) Materials for fabrics used in connection with *air-supported structures* are exempt from compliance with the requirements for *flame-spread ratings* for interior finishes in Subsection 3.1.13.

3.14.2.6. Emergency Air Supply

(1) An *air-supported structure* designed for an *assembly occupancy* with an *occupant load* of more than 200 persons shall have either an automatic emergency engine-generator set capable of powering one blower continuously for 4 h, or a supplementary blower powered by an automatic internal combustion engine.

Section 3.15. Signs

3.15.1. Scope

3.15.1.1. Application

(1) Except as provided otherwise in Article 3.15.1.2. this Section shall apply to the erection of all signs.

3.15.1.2. Exceptions

(1) The following signs shall not be subject to the provisions of this Section,

(a) signs for regulating traffic or similar devices, legal notices or warnings at railroad crossings,

(b) signs in display windows including writing, representation, painting or lettering directly on the surface of any window or door, or other signs not affixed to the *building* interior,

(c) small signs displayed for the direction of the public including signs that identify rest rooms, freight entrances and such other similar directional signs,

(d) signs painted directly on a *building*, and

(e) incidental signs or other signs subject to municipal approval.

3.15.2. Alterations

3.15.2.1. Exceptions for Alterations

(1) The changing of movable parts of signs that are designed for changes, or the repainting of display matter shall not be deemed to be alterations.

3.15.3. Structural Requirements

3.15.3.1. Structural Design

(1) Except as provided in this Section, all sign structures shall be designed in accordance with Part 4.

3.15.4. Plastic Sign Facing Materials

3.15.4.1. Combustible Sign Faces

(1) Plastic materials used in the construction of sign faces shall,

(a) have an average burning rate not greater than 65 mm/min in sheets 1.5 mm thick when tested in accordance with ASTM D635, "Rate of Burning and/or Extent and Time of Burning of Self-supporting Plastics in a Horizontal Position",

(b) have an average burning rate not greater than 140 mm/min when tested in accordance with ASTM D568, "Rate of Burning and/or Extent and Time of Burning of Flexible Plastics in a Vertical Position", and

(c) have a measurement of material thickness in accordance with Method B-Machinists' Micrometer Without Ratchet of ASTM D374, "Thickness of Solid Electrical Insulation".

(2) Except as provided in Sentence (3), where the *exterior cladding* of a wall is required to be *noncombustible*, a plastic sign face or a group of contiguous plastic sign faces may be placed over such cladding provided each such sign face or group of contiguous sign faces,

(a) does not exceed 30% of the wall area of the *storey* on which it is installed,

(b) does not exceed 15 m^2 in area or 1 200 mm in height at each *storey*, and

(c) when located above the *first storey*, is vertically separated from other plastic sign faces by 1 200 mm of *noncombustible construction* unless separated by a horizontal *noncombustible* projection such as a *canopy*, extending the full width of, and projecting at least 900 mm beyond the exterior sign face.

(3) Where a plastic exterior sign is mounted as a face on a metal sign box that is at least 200 mm in depth, the requirements of Sentence (2) need not apply provided the sign box is mounted on a *noncombustible* exterior wall.

(4) Notwithstanding the requirements of Sentence (5), the plastic portion of an interior sign placed over or forming part of an interior wall surface in corridors, covered or enclosed *walkways* at or above *grade* in *buildings* shall,

(a) not exceed 15% of the wall area in, or over which it may be installed,

(b) be supported by a device that will not detrimentally affect the *fire-resistance rating* of the interior wall to which it is attached or of which it may form a part, and encase the edges of the plastic sign face in metal,

(c) not be positioned or sized in such a manner that it is less than 600 mm from the vertical line separating two adjacent premises,

(d) be placed so that there is at least 600 mm vertical separation of *noncombustible* material between the top of the plastic sign surface and the ceiling surface,

(e) be permitted to have an increase of 100% in area required in Clause (a) and a decrease of 50% of the separation distances required in Clauses (c) and (d) if the area is *sprinklered*, and

(f) have a *flame-spreading rating* not more than 250.

(5) Signs in *exits* and underground *walkways* shall have a *flame-spread rating* not more than 25.

3.15.5. Location Restrictions

3.15.5.1. Obstructions not Permitted

(1) No sign shall be located so as to obstruct openings required for light and ventilation, any required *means of egress* or required access for fire fighting in accordance with Sentence 3.2.5.3.(2).

3.15.5.2. Clearance for Exterior Signs

(1) No exterior sign shall be erected overhanging a sidewalk or other pedestrian *walkway* unless the vertical distance, measured from the bottom of the overhanging portion of the sign to the surface of the sidewalk, is at least 2 400 mm.

(2) Except as provided in Sentence (3), no sign face shall be erected within 600 mm of the vehicular travelled portion of a private lane or roadway, or of a motor vehicle parking area unless the minimum vertical distance between *grade* and the bottom of the overhanging sign face is at least 4.25 m.

(3) Where the height of all vehicles using any private road or parking area is permanently restricted, the vertical distance in Sentence (2) may be reduced to the amount of the actual height restriction, for as long as the said height restriction is in existence on the premises.

Section 3.16. Shelf and Rack Storage Systems

3.16.1. Scope

3.16.1.1. Application

(1) The requirements of this Section apply to a *shelf and rack storage system*.

(2) The requirements of Subsection 3.2.8. do not apply to a *shelf and rack storage system* conforming to this Section.

(3) The requirements of Subsection 3.16.2. apply to a *shelf and rack storage system* for the storage of Class I, II, III and IV commodities as defined in NFPA 13, "Installation of Sprinkler Systems".

(4) The requirements of Subsection 3.16.3. apply to a *shelf and rack storage system* for the storage of Group A, B and C plastics and rubber tires as defined in NFPA 13, "Installation of Sprinkler Systems".

3.16.1.2. General

(1) A *shelf and rack storage system* shall not be designed for production, manufacturing, assembling, disassembling or ancillary administrative functions.

(2) A *shelf and rack storage system* may be designed for the storage, accessing, retrieval, packing and distribution of commodities.

(3) A *high hazard industrial occupancy* shall not contain a *shelf and rack storage system*.

(4) Except as required by Sentence 3.16.3.2.(3), a *shelf and rack storage system* shall not exceed 24 m in height.

3.16.1.3. Construction

(1) All structural components of a *shelf and rack storage system*, including posts, beams, decks, walkways, connections and their supports such as concrete slabs and *foundations*, shall be designed in accordance with Part 4.

(2) Except as required by Sentence 3.16.3.2.(2), platform and walkway levels shall be of,

(a) solid construction consisting of steel plate or steel roof decking with a top substrate that forms a serviceable floor area, or

(b) open construction consisting of steel grating or open steel floor planking.

(3) *Guards* and toe-boards shall be provided in accordance with Articles 3.3.1.17. and 3.3.5.8.

(4) Every platform or walkway level shall be provided with fire extinguishers installed in conformance with the provisions of Part 6 of the Fire Code made under the *Fire Protection and Prevention Act, 1997*.

3.16.1.4. Signs

(1) A permanent sign shall be posted in a conspicuous location to indicate the maximum permissible *design loads* for each *shelf and rack storage system*.

(2) Permanent signs shall be posted in conspicuous locations with,

(a) the words **NO SMOKING** in black lettering not less than 50 mm high with a stroke not less than 12 mm on a yellow background, or

(b) a non-smoking symbol having a size not less than 150 mm by 150 mm.

3.16.1.5. Lighting

(1) Walkways and platforms shall be equipped to provide illumination to an average level not less than 50 lx at floor or tread level and at angles and intersections at changes of level where there are stairs or ramps.

(2) Emergency lighting on walkways, platforms, unenclosed egress stairs and *exits* providing *means of egress* shall conform to not less than,

(a) the illumination level in Sentences 3.2.7.3.(2) and (3), and

(b) the duration in Sentence 3.2.7.4.(1).

3.16.1.6. Sprinkler System

(1) An automatic sprinkler system conforming to this Article shall be installed in a *floor area* containing a *shelf and rack storage system*.

(2) The automatic sprinkler system shall be designed, constructed, installed and tested in conformance with NFPA 13, "Installation of Sprinkler Systems" or the appropriate NFPA sprinkler standard for the most severe hazard to which the storage system is exposed.

(3) Sprinkler protection shall be provided under all platforms and walkways.

(4) Except where the platforms or walkways are of open construction, any openings for egress stairs shall be protected by *non-combustible* draft stops not less than 450 mm below the floors above.

(5) The automatic sprinkler system shall be electrically supervised to indicate a trouble signal on the *building* fire alarm system annunciator or where the *building* does not have a fire alarm system, to notify the person controlling the operation of the *building* for each of the situations listed in Sentence 3.2.4.9.(2).

(6) The automatic sprinkler system shall be designed to notify the fire department that a waterflow switch has been activated.

(7) The notification to the person controlling the *building* and the fire department referred to in Sentences (5) and (6) shall be provided in accordance with Sentence 3.2.4.7.(4).

(8) A permanent sign shall be posted, at or near the sprinkler control valve, containing,

(a) the word **NOTICE** in contrasting letters,

(b) a description of the commodity class as defined in NFPA 13, "Installation of Sprinkler Systems", and

(c) the sprinkler design criteria used for the *shelf and rack storage system*.

3.16.1.7. Exits and Means of Egress

(1) Except as permitted in Sentences (2) and (3), every walkway or platform level shall be provided with no fewer than two *exits* conforming to Section 3.4.

(2) An *access to exit* from an elevated platform level may be provided by means of open unenclosed stairs serving,

(a) not more than four platform levels, the highest of which shall be not more than 12 m above the main floor, where the *shelf and rack storage system* is intended for the storage of Class I, II, III and IV commodities, as defined in NFPA 13, "Installation of Sprinkler Systems", and

(b) not more than two platform levels, where the *shelf and rack storage system* is intended for the storage of Group A, B and C plastics and rubber tires, as defined in NFPA 13, "Installation of Sprinkler Systems".

(3) Any single platform or walkway in a *shelf and rack storage system* may be served by a single unenclosed stair leading to the platform or walkway level immediately below provided,

(a) the platform or walkway does not exceed 200 m^2 in area,

(b) the travel distance on the platform or walkway to the level below, including the travel distance along the single unenclosed egress stair, does not exceed 25 m, and

(c) the platform or walkway below is provided with two separate egress stairs or *exits*.

(4) The maximum travel distance on an elevated platform to the ground floor level, including the travel distance along unenclosed stairs, shall not exceed 45 m.

(5) The maximum travel distance on an elevated platform to an *exit* serving that platform shall not exceed 45 m.

(6) Except as permitted in Sentence (7), the maximum travel distance from the bottom of an unenclosed stair to an *exit* along a main aisle on the ground floor level shall not exceed 45 m.

(7) Where the travel distance in Sentence (6) exceeds 45 m,

(a) an egress system serving the *shelf and rack storage system* shall be designed on the basis of a time-based egress analysis using the following criteria:

(i) occupant egress speed of 1 m/sec shall be used for horizontal egress routes within the *shelf and rack storage system*,

(ii) occupant egress speed of 0.6 m/sec shall be used for vertical egress routes within the *shelf and rack storage system*, measured on the diagonal along the nosing of the stairs,

(iii) occupant egress speed of 1.3 m/sec shall be used for horizontal egress routes along a main aisle on the ground floor level,

(iv) each lift-gate shall be accorded an egress time of 10 seconds,

(v) each at-level conveyor cross-over shall be accorded a time of 5 seconds,

(vi) a safety factor of 1.5 shall be used in calculating the total egress time

(b) the total egress time shall be calculated using the following formula:

$$\text{Total Egress Time} = (H_p + V_p/0.6 + H_m/1.3 + 10N_{lg} + 5N_{lc}) \times 1.5 \text{ (in seconds)}$$

where:

H_p = horizontal travel distance on the *shelf and rack storage system*, in metres,

V_p = vertical travel distance on the *shelf and rack storage system*, in metres,

H_m = horizontal travel distance on the main floor, in metres,

N_{lg} = number of lift gates in the *means of egress*,

N_{lc} = number of at-level cross overs in the *means of egress*,

(c) the total egress time from any point in the *shelf and rack storage system* shall be a maximum of 4 minutes,

(d) a fire alarm and detection system conforming to Subsection 3.2.4. shall be installed in the *building*,

(e) *smoke detectors* shall be provided under all solid decking and walkways,

(f) clearly identified and easily accessible pull stations shall be provided at egress stairs, conveyor cross-overs or lift-gates located along egress paths, and

(g) the *occupant load* on each level of the *shelf and rack storage system* shall not exceed 10 persons per egress stair.

(8) A dead end aisle shall not exceed 9 m where the platform or walkway is provided with 2 or more egress facilities.

(9) An aisle serving a *shelf and rack storage system* shall have a clear-aisle width of not less than 760 mm.

(10) Conveyors, trolleys, tracks or any other similar mode of product transportation within the aisle or walkway shall not reduce the clear-aisle width required in Sentence (9).

(11) Where *exits* are provided to comply with Sentence 3.4.2.5.(2), main aisles serving the *shelf and rack storage system* on the ground floor, leading from egress stairs directly to an *exit*, shall be clearly demarcated and have a minimum unobstructed, clear-aisle width of 2.4 m.

(12) Where a lift-gate is incorporated along an egress route,

(a) a maximum of two lift-gates may be within a single egress route,

(b) each lift-gate shall be equipped with a positive lock when open, and

(c) it shall be designed to automatically stop the conveyor belt that it serves when the lift-gate is open.

(13) Where an at-level conveyor cross-over is incorporated along an egress route,

(a) not more than two at-level conveyor cross-overs shall be within a single egress route,

(b) handrails spaced not more than 1 m apart and parallel to the direction of egress shall be provided on both sides of the at-level cross-over,

(c) flat, metal inserts shall be placed between each roller over the required egress width at each at-level conveyor cross-over to provide a walking surface,

(d) at least two inserts not less than 100 mm wide shall be arranged symmetrically between the handrails serving the at-level cross-over,

(e) inserts shall be sized to support loads specified in Part 4,

(f) a clearly identified and easily accessible switch that will stop the conveyor shall be located at each at-level cross-over, and

(g) stairs approaching at-level conveyor cross-overs shall be marked to indicate that they are readily identifiable as part of the egress route.

3.16.2. Storage of Class I, II, III and IV Commodities

3.16.2.1. Application

(1) The requirements in this Subsection apply to a *shelf and rack storage system* intended for the storage of Class I, II, III and IV commodities as defined in NFPA 13, "Installation of Sprinkler Systems".

3.16.2.2. Construction

(1) Where the height of a *shelf and rack storage system*, measured from the floor supporting the system to the topmost portion of the shelf, exceeds 18 m,

(a) a fire alarm and detection system conforming to Subsection 3.2.4. shall be installed with,

  (i) pull stations located at all *exit* doors including *exit* doors serving elevated decks and walkways, and

  (ii) *smoke detectors* located, at the ceiling of all rooms and areas containing the *shelf and rack storage system*, within *exit* stair enclosures at the top, and at every third level of elevated deck or walkway, and

(b) the fire alarm and detection system required by Clause (a), shall be designed to notify the fire department upon activation, and

(c) the *shelf and rack storage system* shall be designed only for the storage of Class I, II and III commodities as defined in NFPA 13, "Installation of Sprinkler Systems".

3.16.3. Storage of Group A, B and C Plastics and Rubber Tires

3.16.3.1. Application

(1) The requirements in this Subsection apply to a *shelf and rack storage system* intended for the storage of Group A, B and C plastics and rubber tires as defined in NFPA 13, "Installation of Sprinkler Systems".

3.16.3.2. Construction

(1) A *shelf and rack storage system* intended for the storage of rubber tires shall conform to the requirements to Subsection 3.3.1. "Indoor Tire Storage" of the Fire Code made under the *Fire Protection and Prevention Act, 1997*.

(2) Platform and walkway levels shall not be of open construction.

(3) A *shelf and rack storage system* shall not exceed 7 m in height.

Section 3.17. Additional Requirements for Change of Use

3.17.1. Scope

3.17.1.1. Application

(1) This Section applies where proposed *construction* in respect of an existing *building* will result in any of the following changes of use of all or part of the *building*:

(a) a change of the *major occupancy* of all or part of a *building* that is designated with a "Y" in Table 1.3.1.4. of Division C,

(b) a *suite* of a Group C *major occupancy* is converted into more than one *suite* of a Group C *major occupancy*,

(c) a *suite* or part of a *suite* of a Group A, Division 2 or a Group A, Division 4 *major occupancy* is converted to a *gaming premises*,

(d) a *farm building* or part of a *farm building* is changed to a *major occupancy*,

(e) a *building* or part of a *building* is changed to a *post-disaster building*, or

(f) the use of a *building* or part of a *building* is changed and the previous *major occupancy* of the *building* or part of the *building* cannot be determined.

(2) For the purposes of this Section and Sentences 11.4.2.1.(1) and 11.4.2.5.(4), the changes of use set out in Clauses (1)(b) to (d) shall also be deemed to constitute a change in *major occupancy*.

(3) The requirements of this Section are in addition to the requirements of other Parts of this Division as they apply to the proposed *construction*.

3.17.2. Additional Construction

3.17.2.1. Change of Use and Compensating Construction

(1) Where proposed *construction* will result in a change of use described in Clauses 3.17.1.1.(1)(a) to (d), additional *construction* shall be required in order that the *building* or part of a *building* subject to the change of use conforms to the requirements of Subsection 3.2.6. and Sections 3.7., 3.11. and 3.12. as they apply to the new *major occupancy* that the *building* or part of a *building* is to support.

(2) For the purposes of this Article, existing *buildings* shall be classified as to their *construction* and *occupancy* as provided for in Sentence 11.2.1.1.(1).

3.17.2.2. Performance Level and Compensating Construction

(1) The *performance level* of a *building* after *construction* shall not be less than the *performance level* of the *building* prior to *construction*.

(2) For the purposes of Sentence (1), reduction of *performance level* shall be determined in accordance with Articles 11.4.2.1., 11.4.2.3. and 11.4.2.5.

(3) Where proposed *construction* would reduce the *performance level* of an existing *building*, compensating *construction* shall be required in conformance with Articles 11.4.3.1., 11.4.3.2., 11.4.3.4. and 11.4.3.6.

(4) Section 11.5. applies in respect of the requirements of Sentences 11.4.3.4.(1), (3) and (4).

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PART 4
STRUCTURAL DESIGN

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4.4.3. Guards Over Retaining Walls
4.4.4. Anchor Systems on Building Exterior
4.4.5. Manure Storage Tanks

Section 4.1. Structural Loads and Procedures

4.1.1. General

4.1.1.1. Scope

(1) The scope of this Part shall be as described in Subsection 1.1.2. of Division A.

4.1.1.2. Reserved

4.1.1.3. Design Requirements

(1) *Buildings* and their structural members and connections including formwork and falsework shall be designed to have sufficient structural capacity and structural integrity to safely and effectively all loads, effects of loads and influences that may reasonably be expected, having regard to the expected service life of *buildings*, and shall in any case satisfy the requirements of this Section.

(2) *Buildings* and their structural members shall be designed for serviceability, in accordance with Articles 4.1.3.4. to 4.1.3.6.

(3) All permanent and temporary structural members, including formwork and falsework of a *building*, shall be protected against loads exceeding the specified loads during the *construction* period except when, as verified by analysis or test, temporary overloading of a structural member would result in no impairment of that member or any other member.

(4) Precautions shall be taken during all stages of *construction* to ensure that the *building* is not damaged or distorted due to loads applied during *construction*.

4.1.1.4 Design Basis

(1) Except as provided in Sentence (2) and (3), *buildings* and their structural members shall be designed in conformance with the procedures and practices provided in this Part.

(2) Provided the design is carried out by a person especially qualified in the specific methods applied and provided the design demonstrates a level of safety and performance in accordance with the requirements of this Part, *buildings* and their structural components falling within the scope of this Part that are not amenable to analysis using a generally established theory may be designed by,

(a) evaluation of a full-scale structure or a prototype by a loading test, or

(b) studies of model analogues.

(3) Communications towers, dish antennas and their supporting structures shall conform to CSA S37, "Antennas, Towers, and Antenna Supporting Structures".

4.1.2. Specified Loads and Effects

4.1.2.1. Loads and Effects

(1) Except as provided in Article 4.1.2.2., the categories of loads, specified loads and effects set out in Table 4.1.2.1.A. shall be taken into consideration in the design of a *building* and its structural members and connections.

Table 4.1.2.1.A.
Categories of Loads, Specified Loads and Effects

Forming Part of Sentence 4.1.2.1.(1)

COLUMN 1	COLUMN 2
Symbol	Loads, Specified Loads, or Effects (1)
D	*dead load* – a permanent load (2) due to the weight of *building* components as specified in Subsection 4.1.4.
E	earthquake load and effects – a rare load (4) due to an earthquake, as specified in Subsection 4.1.8.
H	a permanent load (2) due to lateral earth pressure, including *groundwater*
L	*live load* – a variable load (3) due to intended use and *occupancy* (including loads due to cranes and the pressure of liquids in containers), as specified in Subsection 4.1.5.
P	permanent effects caused by prestress
S	variable load (3) due to snow including ice and associated rain, as specified in Article 4.1.6.2., or due to rain, as specified in Article 4.1.6.4.
T	effects due to contraction, expansion, or deflection caused by temperature changes, shrinkage, moisture changes, creep, ground settlement, or a combination of them
W	wind load – a variable load (3) due to wind, as specified in Subsection 4.1.7.

Notes to Table 4.1.2.1.A.:

(1) load means the imposed deformations (i.e. deflections, displacements or motions that induce deformations and forces in the structure), forces and pressures applied to the *building* structure,

(2) permanent load is a load that changes very little once it has been applied to the structure, except during repair,

(3) variable load is a load that frequently changes in magnitude, direction or location, and

(4) rare load is a load that occurs infrequently and for a short time only.

(2) Minimum specified values of the loads described in Sentence (1), as set forth in Subsections 4.1.4. to 4.1.8., shall be increased to account for dynamic effects where applicable.

(3) For the purpose of determining specified loads **S**, **W** or **E** in Subsections 4.1.6. to 4.1.8., *buildings* shall be assigned an Importance Category based on intended use and *occupancy*, in accordance with Table 4.1.2.1.B.

Table 4.1.2.1.B.
Importance Categories for Buildings

Forming Part of Sentence 4.1.2.1.(3)

COLUMN 1	COLUMN 2
Use and *Occupancy*	Importance Category
Buildings that represent a low direct or indirect hazard to human life in the event of failure, including: • low human-*occupancy buildings*, where it can be shown that collapse is not likely to cause injury or other serious consequences • minor storage *buildings*	Low
All *buildings* except those listed in Importance Categories Low, High and Post-disaster	Normal
Buildings that are likely to be used as post-disaster shelters, including *buildings* whose primary use is: • as an elementary, middle or secondary school • as a community centre Manufacturing and storage facilities containing toxic, explosive or other hazardous substances in sufficient quantities to be dangerous to the public if released	High
Post-disaster buildings	Post-disaster

4.1.2.2. Loads Not Listed

(1) Where a *building* or structural member can be expected to be subjected to loads, forces or other effects not listed in Article 4.1.2.1., such effects shall be taken into account in the design based on the most appropriate information available.

4.1.3. Limit States Design

4.1.3.1. Definitions

(1) In this Part, the term,

(a) "limit states" means those conditions of a *building* structure that result in the *building* ceasing to fulfill the function for which it was designed (Those limit states concerning safety are called ultimate limit states and include exceeding the load-carrying capacity, overturning, sliding and fracture; those limit states that restrict the intended use and *occupancy* of the *building* are called serviceability limit states and include deflection, vibration, permanent deformation and local structural damage such as cracking; and those limit states that represent failure under repeated loading are called fatigue limit states),

(b) "specified loads (**D, E, H, L, P, S, T** and **W**)" mean those loads set out in Table 4.1.2.1.A.,

(c) "principal load" means the specified variable load or rare load that dominates in a given load combination,

(d) "companion load" means a specified variable load that accompanies the principal load in a given load combination,

(e) "service load" means a specified load used for the evaluation of a serviceability limit state,

(f) "principal-load factor" means a factor applied to the principal load in a load combination to account for the variability of the load and load pattern and the analysis of its effects,

(g) "companion-load factor" means a factor that, when applied to a companion load in the load combination, gives the probable magnitude of a companion load acting simultaneously with the factored principal load,

(h) "importance factor, I," means a factor applied in Subsections 4.1.6. to 4.1.8. to obtain the specified load and take into account the consequences of failure as related to the limit state and the use and *occupancy* of the *building*,

(i) "factored load" means the product of a specified load and its principal-load factor or companion-load factor,

(j) "effects" refers to forces, moments, deformations or vibrations that occur in the structure,

(k) "nominal resistance, R," of a member, connection or structure, is based on the geometry and on the specified properties of the structural materials.

(l) "resistance factor, Φ," means a factor applied to a specified material property or to the resistance of a member, connection or structure, and that, for the limit state under consideration, takes into account the variability of dimensions and material properties, workmanship, type of failure and uncertainty in the prediction of resistance, and

(m) "factored resistance, ΦR," means the product of nominal resistance and the applicable resistance factor.

4.1.3.2. Strength and Stability

(1) A *building* and its structural components shall be designed to have sufficient strength and stability so that the factored resistance, ΦR, is greater than or equal to the effect of factored loads, which shall be determined in accordance with Sentence (2).

(2) The effect of factored loads for a *building* or structural component shall be determined in accordance with the load combination cases listed in Table 4.1.3.2. and the requirements of this Article, the applicable combination being that which results in the most critical effect.

(3) Where the effects due to lateral earth pressure, **H**, restraint effects from pre-stress, **P**, and imposed deformation, **T**, affect the structural safety, they shall be taken into account in the calculations, with load factors of 1.5, 1.0 and 1.25 assigned to **H**, **P** and **T** respectively.

(4) Except as provided in Sentence 4.1.8.16.(1), the counteracting factored *dead load*, 0.9**D** in load combination cases 2, 3 and 4 and 1.0**D** in load combination case 5, shall be used when the *dead load* acts to resist overturning, uplift, sliding, failure due to stress reversal, and to determine anchorage requirements and the factored resistance of members.

(5) The principal-load factor 1.5 for *live load*, **L**, in Table 4.1.3.2. may be reduced to 1.25 for liquids in tanks.

(6) The companion-load factor 0.5 for *live load*, **L**, in Table 4.1.3.2. shall be increased to 1.0 for storage areas and for equipment areas and *service rooms* referred to in Table 4.1.5.3.

(7) The load factor 1.25 for *dead load*, **D**, in Table 4.1.3.2. for *soil*, superimposed earth, plants and trees shall be increased to 1.5, except that when the *soil* depth exceeds 1.2 m, the factor may be reduced to $1 + 0.6/h_s$ but not less than 1.25, where h_s is the depth of *soil* in metres supported by the structure.

(8) Earthquake load, **E**, in load combination case 5 of Table 4.1.3.2. includes horizontal earth pressure due to earthquake determined in accordance with Sentence 4.1.8.16.(4).

(9) Provision shall be made to ensure adequate stability of the structure as a whole and adequate lateral, torsional and local stability of all structural parts.

(10) Sway effects produced by vertical loads acting on the structure in its displaced configuration shall be taken into account in the design of *buildings* and their structural members.

Table 4.1.3.2.
Load Combinations for Ultimate Limit States

Forming Part of Sentence 4.1.3.2.(2)

COLUMN 1	COLUMN 2	COLUMN 3
Case	Load Combination(1)	
	Principal Loads	Companion Loads
1	1.4**D**	
2	(1.25**D**(2) or 0.9**D**(3)) +1.5**L**(4)	0.5**S**(5) or 0.4**W**
3	(1.25**D**(2) or 0.9**D**(3)) +1.5**S**	0.5**L**(5)(6) or 0.4**W**
4	(1.25**D**(2) or 0.9**D**(3)) +1.4**W**	0.5**L**(6) or 0.5**S**
5	(1.0**D**(3) or 1.0**E**(7))	0.5**S**(5)(6) or 0.25**S**(5)

Notes to Table 4.1.3.2.:

(1) See Sentences 4.1.3.2.(2) and (3).

(2) See Sentence 4.1.3.2.(7).

(3) See Sentence 4.1.3.2.(4).

(4) See Sentence 4.1.3.2.(5).

(5) See Article 4.1.5.5.

(6) See Sentence 4.1.3.2.(6).

(7) See Sentence 4.1.3.2.(8).

4.1.3.3. Fatigue

(1) A *building* and its structural components, including connections, shall be checked for fatigue failure under the effect of the cyclical loads, as required in the standards listed in Section 4.3.

(2) Where vibration effects, such as resonance and fatigue resulting from machinery and equipment, are likely to be significant, a dynamic analysis shall be carried out.

4.1.3.4. Serviceability

(1) A *building* and its structural components shall be checked for serviceability limit states as defined in Clause 4.1.3.1.(1)(a) under the effect of service loads for serviceability criteria specified or recommended in Articles 4.1.3.5. and 4.1.3.6. and in the standards listed in Section 4.3.

4.1.3.5. Deflection

(1) In proportioning structural members to limit serviceability problems resulting from deflections, consideration shall be given to,

(a) the intended use of the *building* or member,

(b) limiting damage to non-structural members made of materials whose physical properties are known at the time of design,

(c) limiting damage to the structure itself, and

(d) creep, shrinkage, temperature changes and prestress.

(2) The lateral deflection of *buildings* due to service wind and gravity loads shall be checked to ensure that structural elements and non-structural elements, whose nature is known at the time the structural design is carried out, will not be damaged.

(3) Except as provided in Sentence (4), the total drift per *storey* under service wind and gravity loads shall not exceed 1/500 of the *storey* height unless other drift limits are specified in the design standards referenced in Section 4.3.

(4) The deflection limits required in Sentence (3) do not apply to industrial *buildings* or sheds if experience has proven that greater movement will have no significant adverse effects on the strength and function of the *building*.

(5) The *building* structure shall be designed for lateral deflection due to **E**, in accordance with Article 4.1.8.13.

4.1.3.6. Vibration

(1) Floor systems susceptible to vibration shall be designed so that vibrations will have no significant adverse effects on the intended *occupancy* of the *building*.

(2) Where the fundamental vibration frequency of a structural system supporting an *assembly occupancy* used for rhythmic activities, such as dancing, concerts, jumping exercises or gymnastics, is less than 6 Hz, the effects of resonance shall be investigated by means of a dynamic analysis.

(3) A *building* susceptible to lateral vibration under wind load shall be designed in accordance with Article 4.1.7.2. so that the vibrations will have no significant adverse effects on the intended use and *occupancy* of the *building*.

4.1.4. Dead Loads

4.1.4.1. Dead Loads

(1) The specified *dead load* for a structural member consists of,

(a) the weight of the member itself,

(b) the weight of all materials of construction incorporated into the *building* to be supported permanently by the member,

(c) the weight of *partitions*,

(d) the weight of permanent equipment, and

(e) the vertical load due to earth, plants and trees

(2) Except as provided in Sentence (5), in areas of a *building* where *partitions* other than permanent *partitions* are shown on the drawings, or where *partitions* might be added in the future, allowance shall be made for the weight of such *partitions*.

(3) The *partition* weight allowance in Sentence (2) shall be determined from the actual or anticipated weight of the *partitions* placed in any probable position, but shall be not less than 1 kPa over the area of floor being considered.

(4) *Partition* loads used in design shall be shown on the drawings.

(5) In cases where the *dead load* of the *partition* is counteractive, the load allowances referred to in Sentences (2) and (3) shall not be included in the design calculations.

(6) Except for structures where the *dead load* of *soil* is part of the load-resisting system, where the *dead load* due to *soil*, superimposed earth, plants and trees is counteractive, it shall not be included in the design calculations.

4.1.5. Live Loads Due to Use and Occupancy

4.1.5.1. Loads Due to Use of Floors and Roofs

(1) Except as provided in Sentence (2), the specified *live load* on an area of floor or roof depends on the intended use and *occupancy*, and shall not be less than the uniformly distributed load patterns in Article 4.1.5.3., the loads resulting from the intended use or the concentrated loads in Article 4.1.5.10., whichever produces the most critical effect.

(2) For *buildings* in the Low Importance Category as described in Table 4.1.2.1.B., a factor of 0.8 may be applied to the *live load*.

4.1.5.2. Uses Not Stipulated

(1) Except as provided in Sentence (2), where the use of an area of floor or roof is not provided for in Article 4.1.5.3., the specified *live loads* due to the use and *occupancy* of the area shall be determined from an analysis of the loads resulting from the weight of,

(a) the probable assembly of persons,

(b) the probable accumulation of equipment and furnishings, and

(c) the probable storage of materials.

(2) For *buildings* in the Low Importance Category as described in Table 4.1.2.1.B., a factor of 0.8 may be applied to the *live load*.

4.1.5.3. Full and Partial Loading

(1) The uniformly distributed *live load* shall be not less than the value listed in Table 4.1.5.3., which may be reduced as provided in Article 4.1.5.9., applied uniformly over the entire area, or on any portions of the area, whichever produces the most critical effects in the members concerned.

Table 4.1.5.3.
Specified Uniformly Distributed Live Loads on an Area of Floor or Roof

Forming Part of Sentence 4.1.5.3.(1)

COLUMN 1	COLUMN 2
Use of Area of Floor or Roof	Minimum Specified Load, kPa
Assembly Areas (a) Except for those areas listed under (b) and (c), assembly areas with or without fixed seats including	4.8
Arenas	
Auditoria	
Churches and similar places of worship	
Dance floors	
Dining areas(1)	
Foyers and entrance halls	
Grandstands, reviewing stands and bleachers	
Gymnasia	
Museums	
Promenades	
Rinks	
Stadia	
Stages	
Theatres	
Other areas with similar uses	
(b) Assembly areas with fixed seats that have backs over at least 80 percent of the assembly area for the following uses:	2.4
Churches and similar places of worship	
Courtrooms	
Lecture halls	
Theatres	
(c) Classrooms with or without fixed seats	2.4
Attics	
Accessible by a stairway in *residential occupancies* only	1.4
Having limited accessibility so that there is no storage of equipment or materials(1)	0.5

COLUMN 1 Use of Area of Floor or Roof	COLUMN 2 Minimum Specified Load, kPa
Balconies	
Exterior	4.8
Interior and *mezzanines* that could be used for the assembly of people as a viewing area (2)	4.8
Interior and *mezzanines* other than above	(2)
Corridors, lobbies and aisles	
Other than those listed below	4.8
Not over 1 200 mm in width and all upper floor corridors of residential areas only of apartments, *hotels* and motels (that can not be used for the assembly of people as viewing area) (2)	(2)
In a Group B, Division 3 occupancy that contains sleeping accommodation for not more than 10 persons and not more than 6 occupants require assistance in evacuation in case of an emergency.	2.4
Equipment areas and *service rooms* including	3.6(3)
Generator rooms	
Mechanical equipment exclusive of elevators	
Machine rooms	
Pump rooms	
Transformer vaults	
Ventilating or *air-conditioning* equipment	
Exits and fire escapes	4.8
Factories	6.0(3)
Footbridges	4.8
Garages for	
Passenger cars	2.4
Unloaded buses and light trucks	6.0
Loaded buses and trucks and all other trucking spaces	12.0
Kitchens (other than residential)	4.8
Libraries	
Stack rooms	7.2
Reading and study rooms	2.9
Office areas (not including record storage and computer rooms) located in	
Basement and *first storey*	4.8
Floors above *first storey*	2.4
Operating rooms and laboratories	3.6
Patients' bedrooms	1.9
Recreation areas that cannot be used for assembly purposes including	3.6
Billiard rooms	
Bowling alleys	
Pool rooms	
Residential areas (within the scope of Article 1.3.3.2 of Division A)	
Sleeping and living quarters in apartments, *hotels*, motels, boarding schools and colleges	1.9
Work areas within *live/work units*	2.4
Residential areas (within the scope of Article 1.3.3.3 of Division A)	
Bedrooms	1.4
Other areas	1.9
Stairs within *dwelling units*	1.9
Retail and wholesale areas	4.8
Roofs	1.0(4)
Sidewalks and driveways over areaways and *basements*	12.0
Storage areas, including locker rooms in apartment *buildings*	4.8(3)
Toilet areas	2.4
Underground slabs with earth cover	(5)
Warehouses	4.8(3)

Notes to Table 4.1.5.3.:

(1) See Article 4.1.5.6.

(2) See Article 4.1.5.4.

(3) See Article 4.1.5.7.

(4) See Article 4.1.6.1.

(5) See Article 4.1.5.5.

4.1.5.4. Loads for Occupancy Served

(1) The following shall be designed to carry not less than the specified load required for the *occupancy* they serve, provided they cannot be used by an assembly of people as a viewing area:

(a) corridors, lobbies and aisles not more than 1 200 mm wide,

(b) all corridors above the *first storey* of residential areas of apartments, *hotels* and motels, and

(c) interior balconies and *mezzanines*.

4.1.5.5. Loads on Exterior Areas

(1) Exterior areas accessible to vehicular traffic shall be designed for their intended use, including the weight of fire fighting equipment, but not for less than the snow and rain loads prescribed in Subsection 4.1.6.

(2) Except as provided in Sentences (3) and (4), roofs shall be designed for the uniform *live loads* specified in Table 4.1.5.3., the concentrated *live loads* listed in Table 4.1.5.10., or the snow and rain loads prescribed in Subsection 4.1.6., whichever produces the most critical effects in the members concerned.

(3) Exterior areas accessible to pedestrian traffic, but not vehicular traffic, shall be designed for their intended use, but not less than the greater of,

(a) the *live load* prescribed for assembly areas in Table 4.1.5.3., or

(b) the snow, and rain prescribed in Subsection 4.1.6.

(4) Roof parking decks shall be designed for the uniformly distributed *live loads* specified in Table 4.1.5.3., the concentrated *live loads* listed in Table 4.1.5.10., or the roof snow load, whichever produces the most critical effect in the members concerned.

4.1.5.6. Loads for Dining Areas

(1) The minimum specified *live load* listed in Table 4.1.5.3. for dining areas may be reduced to 2.4 kPa for areas in *buildings* that are being converted to dining areas, provided that the *floor area* does not exceed 100 m² and the dining area will not be used for other assembly purposes, including dancing.

4.1.5.7. Floor Loads Due to Intended Use

(1) Equipment areas and *service rooms*, factories, storage areas and warehouses shall be designed for the *live loads* due to their intended use but not less than the specified loads listed in Table 4.1.5.3.

4.1.5.8. More Than One Occupancy

(1) Where an area of floor or roof is intended for 2 or more *occupancies* at different times, the value to be used from Table 4.1.5.3. shall be the greatest value for any of the *occupancies* concerned.

4.1.5.9. Variation with Tributary Area

(1) An area used for *assembly occupancies* designed for a *live load* of less than 4.8 kPa and roofs designed for the minimum loading specified in Table 4.1.5.3. shall have no reduction for tributary area.

(2) Where a structural member supports a tributary area of a floor or a roof, or a combination of them, that is greater than 80 m² and either used for *assembly occupancies* designed for a *live load* of 4.8 kPa or more, or used for storage, manufacturing, retail stores, garages or as a footbridge, the specified *live load* due to use and *occupancy* is the load specified in Article 4.1.5.3. multiplied by,

$$0.5 + \sqrt{20/A}$$

where A is the tributary area in square metres for this type of use and *occupancy*.

(3) Where a structural member supports a tributary area of a floor or a roof or a combination of them, that is greater than 20 m² and used for any use or *occupancy* other than *assembly occupancies* and those indicated in Sentences (1) and (2), the specified *live load* due to use and *occupancy*, is the load specified in Article 4.1.5.3. multiplied by,

$$0.3 + \sqrt{9.8/B}$$

where B is the tributary area in square metres for this type of use and *occupancy*.

(4) Where the specified *live load* for a floor is reduced in accordance with Sentences (2) or (3), the structural drawings shall indicate that a *live load* reduction factor for tributary area has been applied.

4.1.5.10. Concentrated Loads

(1) The specified *live load* due to possible concentrations of load resulting from the use of an area of floor or roof shall not be less than that listed in Table 4.1.5.10. applied over an area of 750 mm by 750 mm located so as to cause maximum effects, except that for *occupancies* not listed in Table 4.1.5.10., the concentrations of load shall be determined in accordance with Article 4.1.5.2.

Table 4.1.5.10.
Specified Concentrated Live Loads on an Area of Floor or Roof

Forming Part of Sentence 4.1.5.10.(1)

COLUMN 1	COLUMN 2
Area of Floor or Roof	Minimum Specified Concentrated Load, kN
Roof surfaces	1.3
Floors of classrooms	4.5
Floors of offices, manufacturing *buildings*, hospital wards and *stages*	9.0
Floors and areas used by passenger cars	11
Floors and areas used by vehicles not exceeding 3600 kg gross weight	18
Floors and areas used by vehicles exceeding 3600 kg but not exceeding 9000 kg gross weight	36
Floors and areas used by vehicles exceeding 9000 kg gross weight	54
Driveways and sidewalks over areaways and *basements*	54

4.1.5.11. Sway Forces in Assembly Occupancies

(1) The floor assembly and other structural elements that support fixed seats in any *building* used for *assembly occupancies* accommodating large numbers of people at one time, such as grandstands, stadia and *theatre* balconies, shall be designed to resist a horizontal force equal to not less than 0.3 kN for each metre length of seats acting parallel to each row of seats, and not less then 0.15 kN for each metre length of seats acting at right angles to each row of seats, based on the assumption that these forces are acting independently of each other.

4.1.5.12. Crane-Supporting Structures and Impact of Machinery and Equipment

(1) The minimum specified load due to equipment, machinery or other objects that may produce impact shall be the sum of the weight of the equipment or machinery and its maximum lifting capacity, multiplied by an appropriate factor listed in Table 4.1.5.12.

(2) Crane runway structures shall be designed to resist a horizontal force applied normal to the top of the rails equal to not less than 20% of the sum of the weights of the lifted load and the crane trolley, excluding other parts of the crane.

(3) The force described in Sentence (2) shall be equally distributed on each side of the runway and shall be assumed to act in either direction.

(4) Crane runway structures shall be designed to resist a horizontal force applied parallel to the top of the rails equal to not less than 10% of the maximum wheel loads of the crane.

Table 4.1.5.12.
Factors for the Calculation of Impact Loads

Forming Part of Sentence 4.1.5.12.(1)

COLUMN 1	COLUMN 2
Cause of Impact	Factor
Operation of cab or radio-operated cranes	1.25
Operation of pendant or hand-operated cranes	1.10
Operation of elevators	(1)
Supports for light machinery, shaft or motor-driven	1.20
Supports for reciprocating machinery (e.g. compressors)	1.50
Supports for power-driven units (e.g. piston engines)	1.50

Notes to Table 4.1.5.12.:

(1) See CSA B44, "Safety Code for Elevators."

4.1.5.13. Bleachers

(1) Bleacher seats shall be designed for a uniformly distributed *live load* of 1.75 kN for each linear metre or for a concentrated load of 2.2 kN distributed over a length of 750 mm, whichever produces the most critical effect on the supporting members.

(2) Bleachers shall be checked by the erector after erection to ensure that all structural members, including bracing specified in the design, have been installed.

(3) Telescopic bleachers shall be provided with locking devices to ensure stability while in use.

4.1.5.14. Helicopter Landing Areas

(1) Helicopter landing areas on roofs shall be constructed in conformance with the requirements contained in "Canadian Aviation Regulations – Part III", published by Transport Canada.

4.1.5.15. Loads on Guards

(1) The minimum specified horizontal load applied inward or outward at the top of every required *guard* shall be,

(a) 3.0 kN/m for *means of egress* in grandstands, stadia, bleachers and arenas,

(b) a concentrated load of 1.0 kN applied at any point for access ways to equipment platforms, contiguous stairs and similar areas where the gathering of many people is improbable, and

(c) 0.75 kN/m or a concentrated load of 1.0 kN applied at any point, whichever governs for locations other than those described in Clauses (a) and (b).

(2) Individual elements within the *guard*, including solid panels and pickets, shall be designed for a load of 0.5 kN applied over an area of 100 mm by 100 mm located at any point in the element or elements so as to produce the most critical effect.

(3) The loads required in Sentence (2) need not be considered to act simultaneously with the loads provided for in Sentences (1) and (4).

(4) The minimum specified load applied vertically at the top of every required *guard* shall be 15 kN/m and need not be considered to act simultaneously with the horizontal load provided for in Sentence (1).

(5) For loads on handrails, refer to Sentence 3.4.6.4.(9).

4.1.5.16. Loads on Vehicle Guardrails

(1) Vehicle guardrails for *storage garages* shall be designed for a concentrated load of 22 kN applied horizontally outward at any point 500 mm above the floor surface.

4.1.5.17. Loads on Walls Acting As Guards

(1) Where the floor elevation on one side of a wall, including a wall around a shaft, is more than 600 mm higher than the elevation of the floor or ground on the other side, the wall shall be designed to resist the appropriate lateral design loads prescribed elsewhere in this Section or 0.5 kPa, whichever produces the more critical effect.

4.1.5.18. Firewalls

(1) *Firewalls* shall be designed to resist the maximum effect due to,

(a) the appropriate lateral design loads prescribed elsewhere in this Section, or

(b) a factored lateral load of 0.5 kPa under fire conditions, as described in Sentence (2).

(2) Under fire conditions, where the *fire-resistance rating* of the structure is less than that of the *firewall*,

(a) lateral support shall be assumed to be provided by the structure on one side only, or

(b) another structural support system capable of resisting the loads imposed by a fire on either side of the *firewall* shall be provided.

4.1.6. Loads Due to Snow and Rain

4.1.6.1. Specified Load Due to Rain or to Snow and Associated Rain

(1) The specified load on a roof or any other *building* surface subject to snow and associated rain shall be the snow load specified in Article 4.1.6.2., or the rain load specified in Article 4.1.6.4., whichever produces the more critical effect.

4.1.6.2. Specified Snow Load

(1) The specified load, S, due to snow and associated rain accumulation on a roof or any other *building* surface subject to snow accumulation shall be calculated from the formula,

$$S = I_s [S_s (C_b C_w C_s C_a) + S_r]$$

where,

I_s = importance factor for snow load as provided in Table 4.1.6.2.,

S_s = 1-in-50-year ground snow load, in kPa, determined in accordance with Subsection 1.1.2.,

C_b = basic roof snow load factor in Sentence (2),

C_w = wind exposure factor in Sentences (3) and (4),

C_s = slope factor in Sentences (5), (6) and (7),

C_a = shape factor in Sentence (8), and

S_r = 1-in-50-year associated rain load, in kPa, determined in accordance with Subsection 1.1.2., but not greater than $S_s(C_bC_wC_sC_a)$.

Table 4.1.6.2.
Importance Factor for Snow Load, I_S

Forming Part of Sentence 4.1.6.2.(1)

COLUMN 1	COLUMN 2	COLUMN 3
Importance Category	Importance Factor, I_s	
	ULS	SLS
Low	0.8	0.9
Normal	1	0.9
High	1.15	0.9
Post-disaster	1.25	0.9

(2) The basic roof snow load factor, C_b, shall be 0.8, except that for large roofs it shall be,

(a) $1.0 - (30/l_c)^2$, for roofs with $C_w = 1.0$ and l_c greater than or equal to 70 m, or

(b) $1.3 - (140/l_c)^2$, for roofs with $C_w = 0.75$ or 0.5 and l_c greater than or equal to 200 m,

where,

l_c = characteristic length of the upper or lower roof, defined as $2w-w^2/l$, in metres,

w = smaller plan dimension of the roof, in metres,

l = larger plan dimension of the roof, in metres.

(3) Except as provided for in Sentence (4), the wind exposure factor, C_w, shall be 1.0.

(4) For *buildings* in the Low and Normal Importance Categories as set out in Table 4.1.2.1.B., the wind exposure factor given in Sentence (3) may be reduced to 0.75, or to 0.5 in exposed areas north of the treeline, where,

(a) the *building* is exposed on all sides to wind over open terrain as defined in Clause 4.1.7.1.(5)(a) , and is expected to remain so during its life,

(b) the area of roof under consideration is exposed to the wind on all sides with no significant obstructions on the roof, such as parapet walls, within a distance of at least 10 times the difference between the height of the obstruction and $C_bC_wS_s/\gamma$ metres, where γ is the unit weight of snow on roofs, and

(c) the loading does not involve the accumulation of snow due to drifting from adjacent surfaces.

(5) Except as provided for in Sentences (6) and (7), the slope factor, C_s, shall be,

(a) 1.0 where the roof slope, α, is equal to or less than 30°,

(b) $(70° - \alpha)/40°$ where α is greater than 30° but not greater than 70°, and

(c) 0 where α exceeds 70°.

(6) The slope factor, C_s, for unobstructed slippery roofs where snow and ice can slide completely off the roof shall be,

(a) 1.0 when the roof slope, α, is equal to or less than 15°,

(b) $(60° - \alpha)/45°$ when α is greater than 15°, but not greater than 60°, and

(c) 0 when α exceeds 60°.

(7) The slope factor, C_s, shall be 1.0 when used in conjunction with shape factors for increased snow loads as given in Clauses (8)(b) and (e).

(8) The shape factor, C_a, shall be 1.0, except that where appropriate for the shape of the roof, it shall be assigned other values that account for,

(a) non-uniform snow loads on gable, arched or curved roofs and domes,

(b) increased snow loads in valleys,

(c) increased non-uniform snow loads due to snow drifting onto a roof that is at a level lower than other parts of the same *building* or at a level lower than another *building* within 5 m of it,

(d) increased non-uniform snow loads on areas adjacent to roof projections, such as penthouses, large *chimneys* and equipment, and

(e) increased snow or ice loads due to snow sliding or meltwater draining from adjacent roofs.

4.1.6.3. Full and Partial Loading

(1) A roof or other *building* surface and its structural members subject to loads due to snow accumulation shall be designed for the specified load in Sentence 4.1.6.2.(1), distributed over the entire loaded area.

(2) In addition to the distribution in Sentence (1), flat roofs and shed roofs, gable roofs of 15° slope or less, and arched or curved roofs shall be designed for the specified uniform snow load indicated in Sentence 4.1.6.2.(1), which shall be calculated using $C_a = 1.0$, distributed on any one portion of the loaded area, and half of this load on the remainder of the loaded area, in such a way as to produce the most critical effects on the member concerned.

4.1.6.4. Specified Rain Load

(1) Except as provided in Sentence (4), the specified load, **S**, due to the accumulation of rainwater on a surface whose position, shape and deflection under load make such an accumulation possible, is that resulting from the one-day rainfall determined in conformance with Subsection 1.1.2. and applied over the horizontal projection of the surface and all tributary surfaces.

(2) The provisions of Sentence (1) apply whether or not the surface is provided with a means of drainage, such as rain water *leaders*.

(3) Except as provided for in Sentence 4.1.6.2.(1), loads due to rain need not be considered to act simultaneously with loads due to snow.

(4) Where scuppers are provided and where the position, shape and deflection of the loaded surface make an accumulation of rainwater possible, the loads due to rain shall be the lesser of either the one-day rainfall determined in conformance with Subsection 1.1.2. or a depth of rainwater equal to 30 mm above the level of the scuppers, applied over the horizontal projection of the surface and tributary areas.

4.1.7. Wind Load

4.1.7.1. Specified Wind Load

(1) The specified external pressure or suction due to wind on part or all of a surface of a *building* shall be calculated using the following formula:

$$p = I_w q C_e C_g C_p$$

where,

p = the specified external pressure acting statically and in a direction normal to the surface, either as a pressure directed towards the surface or as a suction directed away from the surface,

I_w = importance factor for wind load, as provided in Table 4.1.7.1.

q = the reference velocity pressure as provided for in Sentence (4),

C_e = the exposure factor as provided for in Sentence (5),

C_g = the gust effect factor, as provided for in Sentence (6), and

C_p = the external pressure coefficient averaged over the area of the surface considered.

Table 4.1.7.1.
Importance Factor for Wind Load, L_W

Forming Part of Sentence 4.1.7.1.(1) and (3)

COLUMN 1	COLUMN 2	COLUMN 3
Importance Category	Importance Factor, I_W	
	ULS	SLS
Low	0.8	0.75
Normal	1.0	0.75
High	1.15	0.75
Post-disaster	1.25	0.75

(2) The net wind load for the *building* as a whole shall be the algebraic difference of the loads on the windward and the leeward surfaces, and in some cases may be calculated as the sum of the products of the external pressures or suctions and the areas of the surfaces over which they are averaged as provided in Sentence (1).

(3) The net specified pressure due to wind on part or all of a surface of a *building* shall be the algebraic difference of the external pressure or suction as provided for in Sentence (1) and the specified internal pressure or suction due to wind calculated from,

$$p_i = I_w q C_e C_{gi} C_{pi}$$

where,

p_i = specified internal pressure acting statically and in a direction normal to the surface, either as a pressure directed toward the surface or as a suction directed away from the surface,

I_w = importance factor for wind load, as provided in Table 4.1.7.1.

q = the reference velocity pressure, as provided for in Sentence (4),

C_e = the exposure factor, as provided for in Sentence (5),

C_{gi} = internal gust effect factor, as provided for in Sentence (6), and

C_{pi} = the internal pressure coefficient.

(4) The reference velocity pressure, q, shall be the appropriate value determined in conformance with Subsection 1.1.2. based on a probability of being exceeded in any one year of 1-in-50.

(5) The exposure factor C_e, shall be,

(a) $(h/10)^{0.2}$ but not less than 0.9 for open terrain, where open terrain is level terrain with only scattered *buildings*, trees or other obstructions, open water or shorelines, h being the reference height above *grade* in metres for the surface or part of the surface,

(b) $0.7(h/12)^{0.3}$ but not less than 0.7 for rough terrain, where rough terrain is suburban, urban or wooded terrain extending upwind from the *building* uninterrupted for at least 1 km or 10 times the *building height*, whichever is greater, h being the reference height above *grade* in metres for the surface or part of the surface,

(c) an intermediate value between the two exposures defined in Clauses (a) and (b) in cases where the site is less than 1 km or 10 times the *building height* from a change in terrain conditions, whichever is greater, provided an appropriate interpolation method is used, or

(d) if a dynamic approach to the action of wind gusts is used, an appropriate value depending on both height and shielding.

(6) The gust effect factor, C_g, shall be one of the following values:

(a) for the *building* as a whole and main structural members, $C_g = 2.0$,

(b) for external pressures and suctions on small elements including cladding, $C_g = 2.5$,

(c) for internal pressures, $C_{gi} = 2.0$ or a value determined by detailed calculation that takes into account the sizes of the openings in the *building* envelope, the internal volume and the flexibility of the *building* envelope, or

(d) if a dynamic approach to wind action is used, C_g is a value that is appropriate for the turbulence of the wind and the size and natural frequency of the structure.

4.1.7.2. Dynamic Effects of Wind

(1) *Buildings* whose height is greater than 4 times their minimum effective width, which is defined in Sentence (2), or greater than 120 m and other *buildings* whose light weight, low frequency and low damping properties make them susceptible to vibration shall be designed by,

(a) experimental methods for the danger of dynamic overloading, vibration and the effects of fatigue, or

(b) using a dynamic approach to the action of wind gusts.

(2) The effective width, w, of a *building* shall be calculated using the formula,

$$w = \frac{\sum h_i w_i}{\sum h_i}$$

where,

the summations are over the height of the *building* for a given wind direction,

h_i is the height above *grade* to level i, as defined in Sentence 4.1.7.1.(5), and

w_i is the width normal to the wind direction at height h_i,

the minimum effective width is the lowest value of the effective width considering all possible wind directions.

4.1.7.3. Full and Partial Loading

(1) *Buildings* and structural members shall be capable of withstanding the effects of,

(a) the full wind loads acting along each of the two principal horizontal axes considered separately,

(b) the wind loads as described in Clause (a) but with 100% of the load removed from any portion of the area,

(c) the wind loads as in Clause (a) but considered simultaneously at 75% of their full value, and

(d) the wind loads as described in Clause (c) but with 50% of these loads removed from any portion of the area.

4.1.7.4. Interior Walls and Partitions

(1) In the design of interior walls and *partitions*, due consideration shall be given to differences in air pressure on opposite sides of the wall or *partition* that may result from,

(a) pressure differences between the windward and leeward sides of a *building*,

(b) stack effects due to a difference in air temperature between the exterior and interior of the *building*, and

(c) air pressurization by the mechanical services of the *building*.

4.1.8. Earthquake Load and Effects

4.1.8.1. Analysis

(1) The deflections and specified loading due to earthquake motions shall be determined according to the requirements in this Subsection, except that the requirements in this Subsection need not be considered in design if S(0.2), as defined in Sentence 4.1.8.4.(6), is less than or equal to 0.12.

4.1.8.2. Notation

(1) In this Subsection,

A_r = response amplification factor to account for type of attachment of mechanical/electrical equipment, as defined in Sentence 4.1.8.17.(1),

A_x = amplification factor at level x to account for variation of response of mechanical/electrical equipment with elevation within the *building*, as defined in Sentence 4.1.8.17.(1),

B_x = ratio at level x used to determine torsional sensitivity, as defined in Sentence 4.1.8.11.(9),

B = maximum value of B_x, as defined in Sentence 4.1.8.11.(9),

C_p = seismic coefficient for mechanical/electrical equipment, as defined in Sentence 4.1.8.17.(1),

D_{nx} = plan dimension of the *building* at level x perpendicular to the direction of seismic loading being considered,

e_x = distance measured perpendicular to the direction of earthquake loading between centre of mass and centre of rigidity at the level being considered,

F_a = acceleration-based site coefficient, as defined in Sentence 4.1.8.4.(4),

F_t = portion of V to be concentrated at the top of the structure, as defined in Sentence 4.1.8.11.(6),

F_v = velocity-based site coefficient, as defined in Sentence 4.1.8.4.(4),

F_x = lateral force applied to level x, as defined in Sentence 4.1.8.11.(6),

h_i, h_n, h_x = the height above the base (i = 0) to level i, n, or x respectively, where the base of the structure is the level at which horizontal earthquake motions are considered to be imparted to the structure,

h_s = interstorey height ($h_i - h_{i-1}$),

I_E = earthquake importance factor of the structure, as described in Sentence 4.1.8.5.(1),

J = numerical reduction coefficient for base overturning moment, as defined in Sentence 4.1.8.11.(5)

J_X = numerical reduction coefficient for overturning moment at level x, as defined in Sentence 4.1.8.11.(7),

Level i = any level in the *building*, i =1 for first level above the base,

Level n = level that is uppermost in the main portion of the structure,

Level x = level that is under design consideration,

M_v = factor to account for higher mode effect on base shear, as defined in Sentence 4.1.8.11.(5),

M_x = overturning moment at level x, as defined in Sentence 4.1.8.11.(7),

N = total number of *storeys* above exterior *grade* to level n,

$\overline{N}_{60}$ = Average Standard Penetration Resistance for the top 30 m, corrected to a rod energy efficiency of 60% of the theoretical maximum,

PGA = Peak Ground Acceleration expressed as a ratio to gravitational acceleration, as defined in Sentence 4.1.8.4.(1),

PI = plasticity index for clays,

R_d = ductility-related force modification factor reflecting the capability of a structure to dissipate energy through inelastic behaviour, as given in Article 4.1.8.9.,

R_o = overstrength-related force modification factor accounting for the dependable portion of reserve strength in a structure designed according to these provisions, as defined in Article 4.1.8.9.,

S_P = horizontal force factor for part or portion of a *building* and its anchorage, as given in Sentence 4.1.8.17.(1),

$S(T)$ = design spectral response acceleration, expressed as a ratio to gravitational acceleration, for a period of T, as defined in Sentence 4.1.8.4.(6),

$S_a(T)$ = 5% damped spectral response acceleration, expressed as a ratio to gravitational acceleration, for a period of T, as defined in Sentence 4.1.8.4.(1),

SFRS = Seismic Force Resisting System(s) is that part of the structural system that has been considered in the design to provide the required resistance to the earthquake forces and effects defined in Subsection 4.1.8.,

s_u = average undrained shear strength in the top 30 m of *soil*,

T = period in seconds,

T_a = fundamental lateral period of vibration of the *building* or structure in seconds in the direction under consideration, as defined in Sentence 4.1.8.11.(3),

T_x = floor torque at level x, as defined in Sentence 4.1.8.11.(10),

V = lateral earthquake design force at the base of the structure, as determined by Article 4.1.8.11.,

V_d = lateral earthquake design force at the base of the structure, as determined by Article 4.1.8.12.,

V_e = lateral earthquake elastic force at the base of the structure, as determined by Article 4.1.8.12.,

V_P = lateral force on a part of the structure, as determined by Article 4.1.8.17.,

$\overline{V}_S$ = average shear wave velocity in the top 30 m of *soil* or *rock*,

W = *dead load*, as defined in Article 4.1.4.1., except that the minimum *partition* load as defined in Sentence 4.1.4.1.(3) need not exceed 0.5 kPa, plus 25% of the design snow load specified in Subsection 4.1.6., plus 60% of the storage load for areas used for storage, except that *storage garages* need not be considered storage areas, and the full contents of any tanks,

W_i, W_x = portion of W that is located at or is assigned to level i or x respectively,

W_P = weight of a part or portion of a structure, e.g., cladding, *partitions* and appendages,

δ_{ave} = average displacement of the structure at level x, as defined in Sentence 4.1.8.11.(9), and

δ_{max} = maximum displacement of the structure at level x, as defined in Sentence 4.1.8.11.(9).

4.1.8.3. General Requirements

(1) The *building* shall be designed to meet the requirements of this Subsection and of the design standards referenced in Section 4.3.

(2) Structures shall be designed with a clearly defined load path, or paths, that will transfer the inertial forces generated in an earthquake to the supporting ground.

(3) The structure shall have a clearly defined Seismic Force Resisting System(s) (SFRS), as defined in Article 4.1.8.2.

(4) The SFRS shall be designed to resist 100% of the earthquake loads and their effects.

(5) All structural framing elements not considered to be part of the SFRS must be investigated and shown to behave elastically or to have sufficient non-linear capacity to support their gravity loads while undergoing earthquake-induced deformations calculated from the deflections determined in Article 4.1.8.13.

(6) Stiff elements that are not considered part of the SFRS, such as concrete, masonry, brick or pre-cast walls or panels, shall be,

(a) separated from all structural elements of the *building* such that no interaction takes place as the *building* undergoes deflections due to earthquake effects as calculated in this Subsection, or

(b) made part of the SFRS and satisfy the requirements of this Subsection.

(7) Stiffness imparted to the structure from elements not part of the SFRS, other than those described in Sentence (6), shall not be used to resist earthquake deflections but shall be accounted for,

(a) in calculating the period of the structure for determining forces if the added stiffness decreases the fundamental lateral period by more than 15%,

(b) in determining the irregularity of the structure, except the additional stiffness shall not be used to make an irregular SFRS regular or to reduce the effects of torsion, and

(c) in designing the SFRS if inclusion of the elements not part of the SFRS in the analysis has an adverse effect on the SFRS.

(8) Structural modelling shall be representative of the magnitude and spatial distribution of the mass of the *building* and of the stiffness of all elements of the SFRS, including stiff elements that are not separated in accordance with Sentence 4.1.8.3.(6), and shall account for,

(a) the effect of cracked sections in reinforced concrete and reinforced masonry elements,

(b) the effect of the finite size of members and joints,

(c) sway effects arising from the interaction of gravity loads with the displaced configuration of the structure, and

(d) other effects that influence the lateral stiffness of the *building*.

4.1.8.4. Site Properties

(1) The peak ground acceleration (PGA) and the 5% damped spectral response acceleration values, $S_a(T)$, for the reference ground conditions (Site Class C in Table 4.1.8.4.A.) for periods T of 0.2 s, 0.5 s, 1.0 s, and 2.0 s, shall be determined in accordance with Subsection 1.1.2. and are based on a 2% probability of exceedance in 50 years.

(2) Site classifications for ground shall conform to Table 4.1.8.4.A. and shall be determined using $\bar{V}_S$ except as provided in Sentence (3).

(3) If average shear wave velocity, $\bar{V}_S$, is not known, Site Class shall be determined from energy-corrected Average Standard Penetration Resistance, $\bar{N}_{60}$, or from *soil* average undrained shear strength, s_u, as noted in Table 4.1.8.4.A., $\bar{N}_{60}$ and s_u being calculated based on rational analysis.

(4) Acceleration- and velocity-based site coefficients, F_a and F_v, shall conform to Tables 4.1.8.4.B. and 4.1.8.4.C. using linear interpolation for intermediate values of $S_a(0.2)$ and $S_a(1.0)$.

(5) To determine F_a and F_v for Site Class F, site-specific geotechnical investigations and dynamic site response analysis shall be performed.

(6) The design spectral acceleration values of S(T) shall be determined as follows, using linear interpolation for intermediate values of T:

$S(T) = F_aS_a(0.2)$ for $T \leq 0.2$ s

$= F_vS_a(0.5)$ or $F_aS_a(0.2)$, whichever is smaller for $T = 0.5$ s

$= F_vS_a(1.0)$ for $T = 1.0$ s

$= F_vS_a(2.0)$ for $T = 2.0$ s

$= F_vS_a(2.0)/2$ for $T \geq 4.0$ s

Table 4.1.8.4.A.
Site Classification for Seismic Site Response

Forming Part of Sentences 4.1.8.4.(2) and (3)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5
Site Class	Ground Profile Name	Average Properties in Top 30 m		
		Average Shear Wave Velocity, $\overline{V}_S$ (m/s)	Average Standard Penetration Resistance $\overline{N}_{60}$	*Soil* Undrained Shear Strength, s_u
A	Hard *rock*	$\overline{V}_S > 1500$	n/a	n/a
B	*Rock*	$760 < \overline{V}_S \leq 1500$	n/a	n/a
C	Very dense *soil* and soft *rock*	$360 < \overline{V}_S < 760$	$\overline{N}_{60} > 50$	$s_u > 100 kPa$
D	Stiff *soil*	$180 < \overline{V}_S < 360$	$15 \leq \overline{N}_{60} \leq 50$	50 kPa < $s_u \leq$ 100 kPa
E	Soft *soil*	$\overline{V}_S < 180$	$\overline{N}_{60} < 15$	$s_u < 50$ kPa
		Any profile with more than 3 m of *soil* with the following characteristics: • plasticity index: PI>20 • moisture content w ≥40%, and • undrained shear strength: $s_u < 25$ kPa		
F	Other *soils*[1]	Site-specific evaluation required		

Notes to Table 4.1.8.4.A.:

(1) Other *soils* include:

(a) liquefiable *soils*, quick and highly sensitive clays, collapsible weakly cemented *soils*, and other *soils* susceptible to failure or collapse under seismic loading,

(b) peat and/or highly organic clays greater than 3 m in thickness

(c) highly plastic clays (PI > 75) more than 8 m thick, and

(d) soft to medium stiff clays more than 30 m thick.

Table 4.1.8.4.B.
Values of F_a as a Function of Site Class and $S_a(0.2)$

Forming Part of Sentence 4.1.8.4.(4)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6
Site Class	Values of F_a				
	$S_a(0.2) \leq 0.25$	$S_a(0.2) = 0.5$	$S_a(0.2) = 0.75$	$S_a(0.2) = 1.00$	$S_a(0.2) \geq 1.25$
A	0.7	0.7	0.8	0.8	0.8
B	0.8	0.8	0.9	1.0	1.0
C	1.0	1.0	1.0	1.0	1.0
D	1.3	1.2	1.1	1.1	1.0
E	2.1	1.4	1.1	0.9	0.9
F	(1)	(1)	(1)	(1)	(1)

Notes to Table 4.1.8.4.B.:

(1) See Sentence 4.1.8.4.(5)

Table 4.1.8.4.C.
Values of F_v as a Function of Site Class and $S_a(0.1)$

Forming Part of Sentence 4.1.8.4.(4)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6
Site Class	Values of F_v				
	$S_a(1.0) \leq 0.1$	$S_a(1.0) = 0.2$	$S_a(1.0) = 0.3$	$S_a(1.0) = 0.4$	$S_a(1.0) \geq 0.5$
A	0.5	0.5	0.5	0.6	0.6
B	0.6	0.7	0.7	0.8	0.8
C	1.0	1.0	1.0	1.0	1.0
D	1.4	1.3	1.2	1.1	1.1
E	2.1	2.0	1.9	1.7	1.7
F	(1)	(1)	(1)	(1)	(1)

Notes to Table 4.1.8.4.C.:

(1) See Sentence 4.1.8.4.(5)

4.1.8.5. Importance Factor

(1) The earthquake importance factor, I_E, shall be determined according to Table 4.1.8.5.

Table 4.1.8.5.
Importance Factor for Earthquake Loads and Effects, I_E

Forming Part of Sentence 4.1.8.5.(1)

COLUMN 1	COLUMN 2	COLUMN 3
	Importance Factor, I_E	
Importance Category	ULS	SLS[1]
Low	0.8	
Normal	1.0	
High	1.3	
Post-disaster	1.5	

Notes to Table 4.1.8.5.:

(1) See Article 4.1.8.13.

4.1.8.6. Structural Configuration

(1) Structures having any of the features listed in Table 4.1.8.6. shall be designated irregular.

(2) Structures not classified as irregular according to Sentence 4.1.8.6.(1) may be considered regular.

(3) Except as required by Article 4.1.8.10., in cases where $I_E F_a S_a(0.2)$ is equal to or greater than 0.35, structures designated as irregular must satisfy the provisions referenced in Table 4.1.8.6.

Table 4.1.8.6.
Structural Irregularities[1]

Forming Part of Sentence 4.1.8.6.(1)

COLUMN 1	COLUMN 2	COLUMN 3
Type	Irregularity Type and Definition	Notes
1	**Vertical Stiffness Irregularity** Vertical stiffness irregularity shall be considered to exist when the lateral stiffness of the SFRS in a *storey* is less than 70% of the stiffness of any adjacent *storey*, or less than 80% of the average stiffness of the three *storeys* above or below.	(2)(3)
2	**Weight (mass) Irregularity** Weight irregularity shall be considered to exist where the weight, W_i, of any *storey* is more than 150% of the weight of an adjacent *storey*. A roof that is lighter than the floor below need not be considered.	(2)
3	**Vertical Geometric Irregularity** Vertical geometric irregularity shall be considered to exist where the horizontal dimension of the SFRS in any *storey* is more than 130% of that in an adjacent *storey*.	(2)(3)(4)
4	**In-Plane Discontinuity in Vertical Lateral-Force-Resisting Element** An in-plane offset of a lateral-force-resisting element of the SFRS or a reduction in lateral stiffness of the resisting element in the *storey* below.	(2)(3)(4)
5	**Out-of-Plane Offsets** Discontinuities in a lateral force path, such as out-of-plane offsets of the vertical elements of the SFRS.	(2)(3)(4)
6	**Discontinuity in Capacity – Weak Storey** A weak *storey* is one in which the *storey* shear strength is less than that in the *storey* above. The *storey* shear strength is the total strength of all seismic-resisting elements of the SFRS sharing the *storey* shear fo the direction under consideration.	(3)
7	**Torsional Sensitivity (to be considered when diaphragms are not flexible)** Torsional sensitivity shall be considered to exist when the ratio B calculated according to Sentence 4.1.8.11.(9) exceeds 1.7.	(2)(3)(5)
8	**Non-orthogonal Systems** A non-orthogonal system irregularity shall be considered to exist when the SFRS is not oriented along a set of orthogonal axes.	(6)

Notes to Table 4.1.8.6.:

(1) One-storey penthouses with a weight of less than 10% of the level below need not be considered in the application of this Table.

(2) See Article 4.1.8.7.

(3) See Article 4.1.8.10.

(4) See Article 4.1.8.15.

(5) See Sentences 4.1.8.11.(9), (10) and 4.1.8.12.(4).

(6) See Article 4.1.8.8.

4.1.8.7. Methods of Analysis

(1) Analysis for design earthquake actions shall be carried out in accordance with the Dynamic Analysis Procedure described in Article 4.1.8.12., except that the Equivalent Static Force Procedure described in Article 4.1.8.11. may be used for structures that meet any of the following criteria:

(a) in cases where $I_EF_aS_a(0.2)$ is less than 0.35,

(b) regular structures that are less than 60 m in height and have a fundamental lateral period, T_a, less than 2 s in each of two orthogonal directions as defined in Article 4.1.8.8., or

(c) structures with structural irregularity, of Type 1, 2, 3, 4, 5, 6 or 8 as defined in Table 4.1.8.6., that are less than 20 m in height and have a fundamental lateral period, T_a, less than 0.5 s in each of two orthogonal directions as defined in Article 4.1.8.8.

4.1.8.8. Direction of Loading

(1) Earthquake forces shall be assumed to act in any horizontal direction, except that the following shall be considered to provide adequate design force levels in the structure:

(a) where components of the SFRS are oriented along a set of orthogonal axes, independent analyses about each of the principal axes of the structure shall be performed,

(b) where the components of the SFRS are not oriented along a set of orthogonal axes and $I_EF_aS_a(0.2)$ is less than 0.35, independent analyses about any two orthogonal axes is permitted, or

(c) where the components of the SFRS are not oriented along a set of orthogonal axes and $I_EF_aS_a(0.2)$ is equal to or greater than 0.35, analysis of the structure independently in any two orthogonal directions for 100% of the prescribed earthquake loads applied in one direction plus 30% of the prescribed earthquake loads in the perpendicular direction, with the combination requiring the greater element strength being used in the design.

4.1.8.9. SFRS Force Reduction Factors, System Overstrength Factors, and General Restrictions

(1) The values of R_d and R_o and the corresponding system restrictions shall conform to Table 4.1.8.9. and the requirements of this Subsection.

(2) When a particular value of R_d is required by this Article, the corresponding R_o shall be used.

(3) For combinations of different types of SFRS acting in the same direction in the same *storey*, R_dR_o shall be taken as the lowest value of R_dR_o corresponding to these systems.

(4) For vertical variations of R_dR_o, excluding penthouses whose weight is less than 10% of the level below, the value of R_dR_o used in the design of any *storey* shall be less than or equal to the lowest value of R_dR_o used in the given direction for the *storeys* above, and the requirements of Sentence 4.1.8.15.(3) must be satisfied.

(5) If it can be demonstrated through testing, research and analysis that the seismic performance of a structural system is at least equivalent to one of the types of SFRS mentioned in Table 4.1.8.9., then such a structural system will qualify for values of R_d and R_o corresponding to the equivalent type in that Table.

Table 4.1.8.9.
SFRS Ductility-Related Force Modification Factors, R_d, Overstrength-Related Force Modification Factors, R_o, and General Restrictions[1]

Forming Part of Sentence 4.1.8 9.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8
Type of SFRS	R_d	R_o	Restrictions[2]				
			Cases Where $I_EF_aS_a(0.2)$				Cases Where $I_EF_vS_a(1.0)$
			<0.2	≥0.2 to <0.35	≥0.35 to ≤0.75	>0.75	>0.3
Steel Structures Designed and Detailed According to CAN/CSA-S16							
Ductile moment-resisting frames	5.0	1.5	NL	NL	NL	NL	NL
Moderately ductile moment-resisting frames	3.5	1.5	NL	NL	NL	NL	NL
Limited ductility moment-resisting frames	2.0	1.3	NL	NL	60	30	30
Moderately ductile concentrically braced frames							
Non-chevron braces	3.0	1.3	NL	NL	40	40	40
Chevron braces	3.0	1.3	NL	NL	40	40	40
Tension only braces	3.0	1.3	NL	NL	20	20	20
Limited ductility concentrically braced frames							
Non-chevron braces	2.0	1.3	NL	NL	60	60	60
Chevron braces	2.0	1.3	NL	NL	60	60	60
Tension only braces	2.0	1.3	NL	NL	40	40	40
Ductile eccentrically braced frames	4.0	1.5	NL	NL	NL	NL	NL
Ductile frame plate shear walls	5.0	1.6	NL	NL	NL	NL	NL
Moderately ductile plate shear walls	2	1.5	NL	NL	60	60	60
Conventional construction of moment frames, braced frames or shear walls	1.5	1.3	NL	NL	15	15	15
Other steel SFRS(s) not defined above	1.0	1.0	15	15	NP	NP	NP
Concrete Structures Designed and Detailed According to CSA A23.3							
Ductile moment-resisting frames	4.0	1.7	NL	NL	NL	NL	NL
Moderately ductile moment-resisting frames	2.5	1.4	NL	NL	60	40	40
Ductile coupled walls	4.0	1.7	NL	NL	NL	NL	NL
Ductile partially coupled walls	3.5	1.7	NL	NL	NL	NL	NL
Ductile shear walls	3.5	1.6	NL	NL	NL	NL	NL
Moderately ductile shear walls	2.0	1.4	NL	NL	NL	60	60
Conventional construction Moment-resisting frames	1.5	1.3	NL	NL	15	NP	NP
Shear walls	1.5	1.3	NL	NL	40	30	30
Other concrete SFRS(s) not listed above	1.0	1.0	15	15	NP	NP	NP
Timber Structures Designed and Detailed According to CAN/CSA-O86							
Shear walls							
Nailed shear walls: wood-based panel	3.0	1.7	NL	NL	30	20	20
Shear walls: wood-based and gypsum panels in combination	2.0	1.7	NL	NL	20	20	20
Braced or moment-resisting frames with ductile connections							
Moderately ductile	2.0	1.5	NL	NL	20	20	20
Limited ductility	1.5	1.5	NL	NL	15	15	15
Other wood-or gypsum-based SFRS(s) not listed above	1.0	1.0	15	15	NP	NP	NP
Masonry Structures Designed and Detailed According to CSA S304.1							
Moderately ductile shear walls	2.0	1.5	NL	NL	60	40	40
Limited ductility shear walls	1.5	1.5	NL	NL	40	30	30
Conventional construction							
Shear walls	1.5	1.5	NL	60	30	15	15
Moment-resisting frames	1.5	1.5	NL	30	NP	NP	NP
Unreinforced masonry	1.0	1.0	30	15	NP	NP	NP
Other masonry SFRS(s) not listed above	1.0	1.0	15	NP	NP	NP	NP

Notes to Table 4.1.8.9.:

(1) See Article 4.1.8.10.

(2) NP = system is not permitted.

NL = system is permitted and not limited in height as an SFRS; height may be limited in other Parts of the Code.

Numbers in Columns 4 to 8 are maximum height limits in m.

The most stringent requirement governs.

4.1.8.10. Additional System Restrictions

(1) Except as required by Clause (2)(b), structures with a Type 6 irregularity, Discontinuity in Capacity – Weak Storey, as described in Table 4.1.8.6., are not permitted unless $I_E F_a S_a(0.2)$ is less than 0.2 and the forces used for design of the SFRS are multiplied by $R_d R_o$.

(2) *Post disaster buildings* shall,

(a) not have any irregularities conforming to Types 1, 3, 4, 5 and 7 as described in Table 4.1.8.6., in cases where $I_E F_a S_a(0.2)$ is equal to or greater than 0.35,

(b) not have a Type 6 irregularity as described in Table 4.1.8.6., and

(c) have an SFRS with an R_d of 2.0 or greater.

(3) For *buildings* having fundamental lateral periods, T_a, of 1.0 s or greater, and where $I_E F_v S_a(1.0)$ is greater than 0.25, walls forming part of the SFRS shall be continuous from their top to the *foundation* and shall not have irregularities of Type 4 or 5 as described in Table 4.1.8.6.

4.1.8.11. Equivalent Static Force Procedure for Structures Satisfying the Conditions of Article 4.1.8.6.

(1) The static loading due to earthquake motion shall be determined according to the procedures given in this Article.

(2) The minimum lateral earthquake force, V, shall be calculated using the formula,

$$V = S(T_a) M_v I_E W / (R_d R_o)$$

except that V shall not be less than,

$$S(2.0) M_v I_E W / (R_d R_o)$$

and for an SFRS with an R_d equal to or greater than 1.5, V need not be greater than,

$$\tfrac{2}{3} S(0.2) I_E W / (R_d R_o)$$

(3) The fundamental lateral period, T_a, in the direction under consideration in Sentence (2) shall be determined as,

(a) for moment resisting frames that resist 100% of the required lateral forces and where the frame is not enclosed by or adjoined by more rigid elements that would tend to prevent the frame from resisting lateral forces, and where h_n is in metres,

  (i) $0.085 (h_n)^{3/4}$ for steel moment frames,

  (ii) $0.075 (h_n)^{3/4}$ for concrete moment frames, or

  (iii) 0.1 N for other moment frames,

(b) $0.025 h_n$ for braced frames where h_n is in metres,

(c) $0.05 (h_n)^{3/4}$ for shear wall and other structures where h_n is in metres, or

(d) other established methods of mechanics using a structural model that complies with the requirements of Sentence 4.1.8.3.(8), except that,

  (i) for moment resisting frames, T_a shall not be taken greater than 1.5 times that determined in Clause (a),

  (ii) for braced frames, T_a shall not be taken greater than 2.0 times that determined in Clause (b),

  (iii) for shear wall structures, T_a shall not be greater than 2.0 times that determined in Clause (c), and

  (iv) for the purpose of calculating the deflections, the period without the upper limit specified herein may be used.

(4) The weight, W, of the *building* shall be calculated using the formula,

$$W = \sum_{i=1}^{n} W_i$$

(5) The higher mode factor, M_v, and its associated base overturning moment reduction factor, J, shall conform to Table 4.1.8.11.

Table 4.1.8.11.
Higher Mode Factor, M_v, and Base Overturning Reduction Factor, J(1)(2)

Forming Part of Sentence 4.1.8.11.(5)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6
$S_a(0.2)/S_a(2.0)$	Type of Lateral Resisting System	M_V For $T_a \leq 1.0$	M_V For $T_a \geq 2.0$	J For $T_a \leq 0.5$	J For $T_a \geq 2.0$
< 8.0	Moment-resisting frames or coupled walls(3)	1.0	1.0	1.0	1.0
	Braced frames	1.0	1.0	1.0	0.8
	Walls, wall-frame systems, other systems(4)	1.0	1.2	1.0	0.7
≥8.0	Moment-resisting frames or coupled walls(3)	1.0	1.2	1.0	0.7
	Braced frames	1.0	1.5	1.0	0.5
	Walls, wall-frame systems, other systems(4)	1.0	2.5	1.0	0.4

Notes to Table 4.1.8.11.:

(1) For values of M_v between fundamental lateral periods, T_a, of 1.0 and 2.0 s, the product $S(T_a) \cdot M_v$ shall be obtained by linear interpolation.

(2) Values of J between fundamental lateral periods, T_a, of 0.5 and 2.0 s shell be obtained by linear interpolation.

(3) A "coupled wall" is a wall system with coupling beams, where at least 66% of the base overturning moment resisted by the wall system is carried by the axial tension and compression forces resulting from shear in the coupling beams.

(4) For hybrid systems, values corresponding to walls must be used or a dynamic analysis must be carried out as per Article 4.1.8.12.

(6) The total lateral seismic force, V, shall be distributed such that a portion, F_t, shall be assumed to be concentrated at the top of the *building*, where F_t, is equal to 0.07 T_aV but need not exceed 0.25 V and may be considered as zero, where the fundamental lateral period, T_a, does not exceed 0.7 s; the remainder, V - F_t, shall be distributed along the height of the *building*, including the top level, in accordance with the formula,

$$F_x = (V - F_t)\, W_x h_x \Big/ \left(\sum_{i=1}^{n} W_i h_i \right)$$

(7) The structure shall be designed to resist overturning effects caused by the earthquake forces determined in Sentence (6) and the overturning moment at level x, M_x, shall be determined using the formula,

$$M_x = J_x \sum_{i=1}^{n} F_i (h_i - h_x)$$

where,

$J_x =$ 1.0 for $h_x \geq 0.6h_n$, and

$J_x =$ $J + (1 - J)(h_x / 0.6h_n)$ for $h_x < 0.6h_n$

where,

J = base overturning moment reduction factor conforming to Table 4.1.8.11.

(8) Torsional effects that are concurrent with the effects of the forces mentioned in Sentence (6) and are caused by the following torsional moments shall be considered in the design of the structure according to Sentence (10):

(a) torsional moments introduced by eccentricity between the centres of mass and resistance and their dynamic amplification, or

(b) torsional moments due to accidental eccentricities.

(9) Torsional sensitivity shall be determined by calculating the ratio B_x for each level x according to the following equation for each orthogonal direction determined independently:

$$B_x = \delta_{max} / \delta_{ave}$$

where,

B = maximum of all values of B_x in both orthogonal directions, except that the B_x for one-*storey* penthouses with a weight less than 10% of the level below need not be considered,

δ_{max} = maximum *storey* displacement at the extreme points of the structure, at level x in the direction of the earthquake induced by the equivalent static forces acting at distances $\pm 0.10\ D_{nx}$ from the centres of mass at each floor, and

δ_{ave} = average of the displacements at the extreme points of the structure at level x produced by the above mentioned forces.

(10) Torsional effects shall be accounted for as follows:

(a) for a *building* with $B \leq 1.7$, by applying torsional moments about a vertical axis at each level throughout the *building* derived for each of the following load cases considered separately,

(i) $T_x = F_x(e_x + 0.10\ D_{nx})$, and

(ii) $T_x = F_x(e_x - 0.10\ D_{nx})$

where F_x is the lateral force at each level determined according to Sentence (6) and where each element of the *building* is designed for the most severe effect of the above load cases, or

(b) for a *building* with $B \geq 1.7$, in cases where $I_E F_a S_a(0.2)$ is equal to or greater than 0.35, by a Dynamic Analysis Procedure as specified in Article 4.1.8.12.

4.1.8.12. Dynamic Analysis Procedure

(1) The Dynamic Analysis Procedure shall be in accordance with one of the following methods:

(a) Linear Dynamic Analysis by either the Modal Response Spectrum Method or the Numerical Integration Linear Time History Method using a structural model that complies with the requirements of Sentence 4.1.8.3.(8), or

(b) Nonlinear Dynamic Analysis, in which case a special study shall be performed.

(2) The spectral acceleration values used in the Modal Response Spectrum Method shall be the design spectral acceleration values, S(T), defined in Sentence 4.1.8.4.(6).

(3) The ground motion histories used in the Numerical Integration Linear Time History Method shall be compatible with a response spectrum constructed from the design spectral acceleration values, S(T), defined in Sentence 4.1.8.4.(6).

(4) The effects of accidental torsional moments acting concurrently with the lateral earthquake forces that cause them shall be accounted for by the following methods:

(a) the static effects of torsional moments due to $(\pm 0.10\ D_{nx})F_x$ at each level x, where F_x is determined from Sentence 4.1.8.11.(6) or from the dynamic analysis, shall be combined with the effects determined by dynamic analysis, or

(b) if B, as defined in Sentence 4.1.8.11.(9), is less than 1.7, it is permitted to use a three-dimensional dynamic analysis with the centres of mass shifted by a distance of $-0.05\ D_{nx}$ and $+0.05\ D_{nx}$.

(5) The elastic base shear, V_e, obtained from a Linear Dynamic Analysis shall be multiplied by the importance factor, I_E, as determined in Article 4.1.8.5., and shall be divided by $R_d R_o$, as determined in Article 4.1.8.9., to obtain the base shear, V_d.

(6) Except as required by Sentence (7), if the base shear, V_d, obtained in Sentence (5) is less than 80% of the lateral earthquake design force, V, of Article 4.1.8.11., V_d shall be taken as 0.8 V.

(7) For irregular structures requiring dynamic analysis in accordance with Article 4.1.8.7., V_d shall be taken as the larger of the V_d determined in Sentence (5) and 100% of V.

(8) Except as required by Sentence (9), the values of elastic *storey* shears, *storey* forces, member forces, and deflections obtained from the Linear Dynamic Analysis shall be multiplied by V_d/V_e to determine their design values, where V_d is the base shear.

(9) For the purpose of calculating deflections, it is permitted to use a value for V based on the value for T_a determined in Clause 4.1.8.11.(3)(d) to obtain V_d in Sentences (6) and (7).

4.1.8.13. Deflections and Drift Limits

(1) Lateral deflections of a structure shall be calculated in accordance with the loads and requirements defined in this Subsection.

(2) Lateral deflections obtained from a linear elastic analysis using the methods given in Articles 4.1.8.11. and 4.1.8.12. and incorporating the effects of torsion, including accidental torsional moments, shall be multiplied by $R_d R_o / I_E$ to give realistic values of anticipated deflections.

(3) Based on the lateral deflections calculated in Sentence (2), the largest interstorey deflection at any level shall be limited to 0.01 h_s for *post-disaster buildings*, 0.02 h_s for schools, and 0.025 h_s for all other *buildings*.

(4) The deflections calculated in Sentence (2) shall be used to account for sway effects as required by Sentence 4.1.3.2.(10).

4.1.8.14. Structural Separation

(1) Adjacent structures shall either be separated by the square root of the sum of the squares of their individual deflections calculated in Sentence 4.1.8.13.(2), or shall be connected to each other.

(2) The method of connection required in Sentence (1) shall take into account the mass, stiffness, strength, ductility and anticipated motion of the connected *buildings* and the character of the connection.

(3) Rigidly connected *buildings* shall be assumed to have the lowest R_dR_o value of the *buildings* connected.

(4) *Buildings* with non-rigid or energy-dissipating connections require special studies.

4.1.8.15. Design Provisions

(1) Diaphragms and their connections shall be designed so as not to yield, and the design shall account for the shape of the diaphragm, including openings, and for the forces generated in the diaphragm due to the following cases, whichever one governs:

(a) forces due to loads determined in Articles 4.1.8.11. or 4.1.8.12. applied to the diaphragm are increased to reflect the lateral load capacity of the SFRS, plus forces in the diaphragm due to the transfer of forces between elements of the SFRS associated with the lateral load capacity of such elements and accounting for discontinuities and changes in stiffness in these elements, or

(b) a minimum force corresponding to the design-based shear divided by N for the diaphragm at level x.

(2) In cases where $I_EF_aS_a(0.2)$ is equal to or greater than 0.35, the elements supporting any discontinuous wall, column or braced frame shall be designed for the lateral load capacity of the components of the SFRS they support.

(3) Where structures have vertical variations of R_dR_o satisfying Sentence 4.1.8.9.(4), the elements of the SFRS below the level where the change in R_dR_o occurs shall be designed for the forces associated with the lateral load capacity of the SFRS above that level.

(4) Where earthquake effects can produce forces in a column or wall due to lateral loading along both orthogonal axes, account shall be taken of the effects of potential concurrent yielding of other elements framing into the column or wall from all directions at the level under consideration and as appropriate at other levels.

(5) Except as provided in Sentence (6), the design forces need not exceed the forces determined in accordance with Sentence 4.1.8.7.(1), multiplied by R_dR_o.

(6) If *foundation* rocking is accounted for, the design forces for the SFRS need not exceed the maximum values associated with *foundation* rocking, provided that R_d and R_o for the type of SFRS used conform to Table 4.1.8.9. and that the *foundation* is designed in accordance with Sentence 4.1.8.16.(1).

4.1.8.16. Foundation Provisions

(1) *Foundations* shall be designed to resist the lateral load capacity of the SFRS, except that when the *foundations* are allowed to rock, the design forces for the *foundation* need not exceed those determined in Sentence 4.1.8.7.(1) using an R_dR_o equal to 2.0.

(2) The design of *foundations* shall be such that they are capable of transferring earthquake loads and effects between the *building* and the ground without exceeding the capacities of the *soil* and *rock*.

(3) In cases where $I_EF_aS_a(0.2)$ is equal to or greater than 0.35, the following requirements shall be satisfied:

(a) *piles* or *pile* caps, drilled piers, and caissons shall be interconnected by continuous ties in no fewer than two directions,

(b) *piles*, drilled piers, and caissons shall be embedded a minimum of 100 mm into the *pile* cap or structure, and

(c) *piles*, drilled piers, and caissons, other than wood *piles*, shall be connected to the *pile* cap or structure for a minimum tension force equal to 0.15 times the factored compression load on the *pile*.

(4) At sites where $I_EF_aS_a(0.2)$ is equal to or greater than 0.35, *basement* walls shall be designed to resist earthquake lateral pressures from backfill or natural ground.

(5) At sites where $I_EF_aS_a(0.2)$ is greater than 0.75, the following requirements shall be satisfied:

(a) *piles*, drilled piers, or caissons shall be designed and detailed to accommodate cyclic inelastic behaviour when the design moment in the element due to earthquake effects is greater than 75% of its moment capacity, and

(b) spread footings founded on *soil* defined as Site Class E or F shall be interconnected by continuous ties in no fewer than two directions.

(6) Each segment of a tie between elements that is required by Clauses (3)(a) or (5)(b) shall be designed to carry by tension or compression a horizontal force at least equal to the greatest factored *pile* cap or column vertical load in the elements it connects, multiplied by a factor of 0.10 $I_EF_aS_a(0.2)$, unless it can be demonstrated that equivalent restraints can be provided by other means.

(7) The potential for liquefaction of the *soil* and its consequences, such as significant ground displacement and loss of *soil* strength and stiffness, shall be evaluated based on the ground motion parameters referenced in Subsection 1.1.2. and shall be taken into account in the design of the structure and its *foundations*.

4.1.8.17. Elements of Structures, Non-structural Components and Equipment

(1) Except as provided in Sentences (2) and (8), elements and components of *buildings* described in Table 4.1.8.17. and their connections to the structure shall be designed to accommodate the *building* deflections calculated in accordance with Article 4.1.8.13. and the element or component deflections calculated in accordance with Sentence (10), and shall be designed for a lateral force, V_P, applied through the centre of mass of the element or component that is equal to:

$$V_p = 0.3F_aS_a(0.2)\,I_ES_pW_p$$

where,

F_a = as defined in Table 4.1.8.4.B.,

$S_a(0.2)$ = spectral response acceleration value at 0.2 s, as defined in Sentence 4.1.8.4.(1),

I_E = importance factor for the *building*, as defined in Article 4.1.8.5.,

S_p = $C_pA_rA_x/R_p$ (the maximum value of S_p shall be taken as 4.0 and the minimum value of S_p shall be taken as 0.7), where

C_p = element or component factor from Table 4.1.8.17.,

A_r = element or component force amplification factor from Table 4.1.8.17.,

A_x = height factor $(1 + 2\,h_x / h_n)$,

R_p = element or component response modification factor from Table 4.1.8.17., and

W_p = weight of the component or element.

(2) For *buildings* other than *post-disaster buildings*, where $I_EF_aS_a(0.2)$ is less than 0.35, the requirements of Sentence (1) need not apply to Categories 6 through 21 of Table 4.1.8.17.

(3) The values of C_p in Sentence (1) shall conform to Table 4.1.8.17.

(4) For the purpose of applying Sentence (1) and Categories 11 and 12 of Table 4.1.8.17., elements or components shall be assumed to be flexible or flexibly connected unless it can be shown that the fundamental period of the element or component and its connection is less than or equal to 0.06 s, in which case the element or component is classified as being rigid or rigidly connected.

(5) The weight of access floors shall include the *dead load* of the access floor and the weight of permanent equipment, which shall not be taken as less than 25% of the floor *live load*.

(6) When the mass of a tank plus its contents is greater than 10% of the mass of the supporting floor, the lateral forces shall be determined by rational analysis.

(7) Forces shall be applied in the horizontal direction that results in the most critical loading for design, except for Category 6 of Table 4.1.8.17., where the forces shall be applied up and down vertically.

(8) Connections to the structure of elements and components listed in Table 4.1.8.17. shall be designed to support the component or element for gravity loads, shall conform to the requirements of Sentence (1), and shall also satisfy these additional requirements:

(a) friction due to gravity loads shall not be considered to provide resistance to seismic forces,

(b) R_p for non-ductile connections, such as adhesives or power actuated fasteners, shall be taken as 1.0,

(c) R_p for anchorage using shallow expansion, chemical, epoxy or cast-in place anchors shall be 1.5, where shallow anchors are those with a ratio of embedment length to diameter of less than 8,

(d) power-actuated fasteners and drop-in anchors shall not be used for tension loads,

(e) connections for non-structural elements or components of Categories 1, 2 or 3 of Table 4.1.8.17. attached to the side of a *building* and above the first level above *grade* shall satisfy the following requirements:

  (i) for connections where the body of the connection is ductile, the body shall be designed for values of C_P, A_r and R_p given in Table 4.1.8.17., and the fasteners, such as anchors, welds, bolts and inserts, shall also be designed for values of C_p and A_r given in this Table, and R_p = 1.0, and

  (ii) connections where the body of the connection is not ductile shall be designed for values of C_p=2.0, R_p =1.0 and A_r given in Table 4.1.8.17., and

(f) for the purpose of applying Clause (e), a ductile connection is one where the body of the connection yields at its design load.

(9) Floors and roofs acting as diaphragms shall satisfy the requirements for diaphragms stated in Article 4.1.8.15.

(10) Lateral deflections of elements or components shall be based on the loads defined in Sentence (1) and lateral deflections obtained from an elastic analysis shall be multiplied by R_p/I_E to give realistic values of the anticipated deflections.

(11) The elements or components shall be designed so as not to transfer to the structure any forces unaccounted for in the design, and rigid elements such as walls or panels shall satisfy the requirements of Sentence 4.1.8.3.(6).

(12) Seismic restraint for suspended equipment, pipes, ducts, electrical cable trays, etc. shall be designed to meet the force and displacement requirements of this Article and be constructed in a manner that will not subject hanger rods to bending.

(13) Isolated suspended equipment and components, such as pendant lights, maybe designed as a pendulum system provided that adequate chains or cables capable of supporting 2.0 times the weight of the suspended component are provided and the deflection requirements of Sentence (11) are satisfied.

Table 4.1.8.17.
Elements of Structures and Non structural Components and Equipment

Forming Part of Sentence 4.1.8.17.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5
Category	Part or portion of *Building*	C_p	A_r	R_p
1	All exterior and interior walls except those in Category 2 or 3(1)	1.00	1.00	2.50
2	Cantilever parapet and other cantilever walls except retaining walls(1)	1.00	2.50	2.50
3	Exterior and interior ornamentations and appendages(1)	1.00	2.50	2.50
4	Floors and roofs acting as diaphragms(2)	-	-	2.50
5	Towers, *chimneys*, smokestacks and penthouses when connected to or forming part of a *building*	1.00	2.50	2.50
6	Horizontally cantilevered floors, balconies, beams, etc.	1.00	1.00	2.50
7	Suspended ceilings, light fixtures and other attachments to ceilings with independent vertical support	1.00	1.00	2.50
8	Masonry veneer connections	1.00	1.00	1.50
9	Access floors	1.00	1.00	2.50
10	Masonry or concrete fences more than 1.8 m tall	1.00	1.00	2.50
11	Machinery, fixtures, equipment, ducts and tanks (including contents)			
	that are rigid and rigidly connected(3)	1.00	1.00	1.25
	that are flexible or flexibly connected(3)	1.00	2.50	2.50
12	Machinery, fixtures, equipment, ducts and tanks (including contents) containing toxic or explosive materials, materials having a *flash point* below 38°C or firefighting fluids			
	that are rigid and rigidly connected(3)	1.50	1.00	1.25
	that are flexible or flexibly connected(3)	1.50	2.50	2.50
13	Flat bottom tanks (including contents) attached directly to a floor at or below *grade* within a *building*	0.70	1.00	2.50
14	Flat bottom tanks (including contents) attached directly to a floor at or below *grade* within a *building* containing toxic or explosive materials, materials having a having a *flash point* below 38°C or firefighting fluids	1.00	1.00	3.00
15	Pipes, ducts, cable trays (including contents)	1.00	1.00	3.00
16	Pipes, ducts (including contents) containing toxic or explosive materials	1.50	1.00	3.00
17	Electrical cable trays, bus ducts, conduits	1.00	2.50	5.00
18	Rigid components with ductile material and connections	1.00	1.00	2.50
19	Rigid components with non-ductile material or connections	1.00	1.00	1.00
20	Flexible components with ductile material and connections	1.00	2.50	2.50
21	Flexible components with non-ductile material or connections	1.00	2.50	1.00

Notes to Table 4.1.8.17.:

(1) See Sentence 4.1.8.17.(8).

(2) See Sentence 4.1.8.17.(9).

(3) See Sentence 4.1.8.17.(4).

Section 4.2. Foundations

4.2.1. General

4.2.1.1. Application

(1) This Section applies to *excavations* and *foundation* systems for *buildings*.

4.2.2. Subsurface Investigations and Reviews

4.2.2.1. Subsurface Investigation

(1) A *subsurface investigation*, including *groundwater* conditions, shall be carried out, by or under the direction of a person having knowledge and experience in planning and executing such investigations to a degree appropriate for the *building* and its use, the ground and the surrounding site conditions.

4.2.2.2. Field Review

(1) A field review shall be carried out by the *designer* or by another suitably qualified person to ascertain that the subsurface conditions are consistent with the design and that *construction* is carried out in accordance with the design and good engineering practice.

(2) The review required in Sentence (1) shall be carried out,

(a) on a continuous basis,

  (i) during the *construction* of all *deep foundation units* with all pertinent information recorded for each *foundation unit*,

  (ii) during the installation and removal of retaining structures and related backfilling operations, and

  (iii) during the placement of engineered *fills* that are to be used to support the *foundation units*, and

(b) as required, unless otherwise directed by the *chief building official*,

  (i) in the *construction* of all *shallow foundation units*, and

  (ii) in excavating, dewatering and other related works.

4.2.2.3. Altered Subsurface Condition

(1) If during *construction*, the *soil*, *rock* or *groundwater* is found not to be of the type or in the condition used in design, and as indicated on the drawings, the design shall be reassessed by the *designer*.

(2) If during *construction*, climatic or any other conditions have changed the properties of the *soil*, *rock* or *groundwater*, the design shall be reassessed by the *designer*.

4.2.3. Materials Used in Foundations

4.2.3.1. Wood

(1) Wood used in *foundations* or in support of *soil* or *rock* shall conform to the appropriate requirements of Subsection 4.3.1.

4.2.3.2. Preservation Treatment of Wood

(1) Wood exposed to *soil* or air above the lowest anticipated *groundwater* table shall be treated with preservative in conformance with CSA O80 Series, "Wood Preservation", and the requirements of the appropriate commodity standard as follows:

(a) CSA-O80.2, "Preservative Treatment of Lumber, Timber, Bridge Ties and Mine Ties by Pressure Processes",

(b) CSA-O80.3, "Preservative Treatment of Piles by Pressure Processes", or

(c) CSA-O80.15, "Preservative Treatment of Wood for Building Foundation Systems, Basements and Crawl Spaces by Pressure Processes".

(2) Where timber has been treated as required in Sentence (1), it shall be cared for as provided in AWPA-M4, "Care of Preservative-Treated Wood Products", as revised by Clause 6 of CSA O80 Series, "Wood Preservation".

4.2.3.3. Plain and Reinforced Masonry

(1) Plain or reinforced masonry used in *foundations* or in support of *soil* or *rock* shall conform to the requirements of Subsection 4.3.2.

4.2.3.4. Prevention of Deterioration of Masonry

(1) Where plain or reinforced masonry in *foundations* or in structures supporting *soil* or *rock* may be subject to conditions conducive to deterioration, protection shall be provided to prevent such deterioration.

4.2.3.5. Concrete

(1) Plain, reinforced or prestressed concrete used in *foundations* or in support of *soil* or *rock* shall conform to the requirements of Subsection 4.3.3.

4.2.3.6. Protection Against Chemical Attack

(1) Where concrete in *foundations* may be subject to chemical attack, it shall be treated in conformance with the requirements in CAN/CSA-A23.1, "Concrete Materials and Methods of Concrete Construction".

4.2.3.7. Steel

(1) Steel used in *foundations* or in support of *soil* or *rock* shall conform with the appropriate requirements of Subsections 4.3.3. or 4.3.4., unless otherwise specified in this Section.

4.2.3.8. Steel Piles

(1) Where steel *piles* are used in *deep foundations* and act as permanent load-carrying members, the steel shall conform with one of the following standards:

(a) ASTM A252, "Welded and Seamless Steel Pipe Piles",

(b) ASTM A283 / A283M, "Low and Intermediate Tensile Strength Carbon Steel Plates",

(c) ASTM A1008 / A1008M , "Steel, Sheet, Cold Rolled, Carbon, Structural,High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability",

(d) ASTM A1011 / A1011M, "Steel, Sheet and Strip, Hot Rolled, Carbon, Structural, High Strength Low Alloy and High Strength Low Alloy with Improved Formability", or

(e) CAN/CSA-G40.21, "Structural Quality Steel".

4.2.3.9. High Strength Steel Tendons

(1) Where high strength steel is used for tendons in anchor systems used for the permanent support of a *foundation* or in the erection of temporary support of *soil* or *rock* adjacent to an *excavation*, it shall conform with the requirements of CAN/CSA-A23.1, "Concrete Materials and Methods of Concrete Construction".

4.2.3.10. Corrosion of Steel

(1) Where conditions are corrosive to steel, adequate protection of exposed steel shall be provided.

4.2.4. Design Requirements

4.2.4.1. Design Basis

(1) The design of *foundations*, *excavations* and *soil* – and *rock*-retaining structures shall be based on a *subsurface investigation* carried out by a person competent in this field of work, and on any of the following:

(a) application of generally accepted geotechnical and civil engineering principles by a person especially qualified in this field of work as provided in this Section and other Sections of this Part,

(b) established local practice where such practice includes successful experience both with *soils* and *rocks* of similar type and condition and with a *foundation* or *excavation* of similar type, *construction* method, size and depth, or

(c) in situ testing of *foundation units* such as the load testing of *piles*, anchors or footings carried out by a person competent in this field of work.

(2) The *foundations* of a *building* shall be capable of resisting all the loads stipulated in Section 4.1., in accordance with limit states design in Subsection 4.1.3.

(3) For the purpose of the application of the load combinations given in Table 4.1.3.2., the geotechnical components of loads and the factored geotechnical resistances at ULS shall be determined by a suitably qualified and experienced person.

(4) Geotechnical components of service loads and geotechnical reactions for SLS shall be determined by a suitably qualified and person.

(5) The *foundation* of a *building* shall be designed to satisfy SLS requirements within the limits that the *building* is designed to accommodate, including total settlement and differential settlement, heave, lateral movement, tilt or rotation.

(6) Communication, interaction and coordination between the *designer* and the person responsible for the geotechnical aspects of the project shall take place to a degree commensurate with the complexity and requirements of the project.

4.2.4.2. Subsurface Investigation

(1) A *subsurface investigation* shall be carried out to the depth and extent to which the *building* or *excavation* will significantly change the stress in the *soil* or *rock*, or to such a depth and extent as to provide all the necessary information for the design and *construction* of the *excavation* or the *foundations*.

4.2.4.3. Identification

(1) The identification and classification of *soil, rock* and *groundwater* and descriptions of their engineering and physical properties shall be in accordance with a widely accepted system.

4.2.4.4. Depth of Foundations

(1) Except as permitted in Sentence (2), the *bearing surface* of a *foundation* shall be below the level of potential damage, including damage resulting from *frost action*, and the *foundation* shall be designed to prevent damage resulting from *adfreezing* and frost jacking.

(2) The *bearing surface* of a *foundation* need not be below the level of potential damage from frost where the *foundation*,

(a) is designed against *frost action*, or

(b) overlies material not susceptible to *frost action*.

4.2.4.5. Sloping Ground

(1) Where a *foundation* is to rest on, in or near sloping ground, this particular condition shall be provided for in the design.

4.2.4.6. Eccentric and Inclined Loads

(1) Where there is eccentricity or inclination of loading in *foundation units*, this effect shall be fully investigated and provided for in the design.

4.2.4.7. Dynamic Loading

(1) Where dynamic loading conditions apply, the effects shall be assessed by a special investigation of these conditions and provided for in the design.

4.2.4.8. Hydrostatic Uplift

(1) Where a *foundation* or any part of a *building* is subject to hydrostatic uplift the effects shall be provided for in the design.

4.2.4.9. Groundwater Level Charge

(1) Where proposed *construction* will result in a temporary or permanent change in the *groundwater level*, the effects of this change on adjacent *buildings* shall be fully investigated and provided for in the design.

4.2.4.10. Permafrost

(1) Where conditions of permafrost are encountered or proven to exist, the design of the *foundation* shall be based upon analysis of these conditions by a person especially qualified in that field of work.

4.2.4.11. Swelling and Shrinking Soils

(1) Where swelling or shrinking *soils*, in which movements resulting from moisture content changes may be sufficient to cause damage to a structure, are encountered or known to exist, such a condition shall be fully investigated and provided for in the design.

4.2.4.12. Expanding and Deteriorating Rock

(1) Where *rock* that expands or deteriorates when subjected to unfavourable environmental conditions or to stress release is known to exist, this condition shall be fully investigated and provided for in the design.

4.2.4.13. Construction on Fill

(1) *Buildings* may be placed on *fill* if it can be shown by *subsurface investigation* that,

(a) the *fill* is or can be made capable of safely supporting the *building*,

(b) detrimental movement of the *building* or services leading to the *building* will not occur, and

(c) explosive gases can be controlled or do not exist.

4.2.4.14. Structural Design

(1) The structural design of the *foundation* of a *building*, the procedures and *construction* practices shall conform with the appropriate Sections of this Code unless otherwise specified in this Section.

4.2.5. Excavations

4.2.5.1. Design of Excavations

(1) The design of *excavations* and of supports for the sides of *excavations* shall conform to the requirements of Subsection 4.2.4. and this Subsection.

4.2.5.2. Excavation Construction

(1) Every *excavation* shall be undertaken in such a manner as to prevent movement that would cause damage to adjacent *buildings* at all phases of *construction*.

(2) Material shall not be placed nor shall equipment be operated or placed in or adjacent to an *excavation* in a manner that may endanger the integrity of the *excavation* or its supports.

4.2.5.3. Supported Excavations

(1) The sides of an *excavation* in *soil* or *rock* shall be supported by a retaining structure conforming with the requirements of Articles 4.2.5.1. and 4.2.5.2., except as permitted in Article 4.2.5.4.

4.2.5.4. Unsupported Excavations

(1) The sides of an *excavation* in *soil* or *rock* may be unsupported where a design is prepared by a person especially qualified in this field of work in conformance with the requirements of Articles 4.2.5.1. and 4.2.5.2.

4.2.5.5. Control of Water Around Excavations

(1) *Surface water*, all *groundwater*, *perched groundwater* and in particular *artesian groundwater* shall be kept under control at all phases of *excavation* and *construction*.

4.2.5.6. Loss of Ground

(1) At all phases of *excavation* and *construction*, loss of ground due to water or any other cause shall be prevented.

4.2.5.7. Protection and Maintenance at Excavations

(1) All sides of an *excavation*, supported and unsupported, shall be continuously maintained and protected from possible deterioration by *construction* activity or by the action of frost, rain and wind.

4.2.5.8. Backfilling

(1) Where an *excavation* is backfilled, the backfill shall be placed so as to,

(a) provide lateral support to the *soil* adjacent to the *excavation*, and

(b) prevent detrimental movements.

(2) The material used as backfill or *fill* supporting a footing, *foundation* or a floor on *grade* shall be of a type that is not subject to detrimental volume change with changes in moisture content and temperature.

4.2.6. Shallow Foundations

4.2.6.1. Design of Shallow Foundations

(1) The design of *shallow foundations* shall be in conformance with the requirements of Subsection 4.2.4. and this Subsection.

4.2.6.2. Support of Shallow Foundations

(1) Where a *shallow foundation* is to be placed on *soil* or *rock*, the *soil* or *rock* shall be cleaned of loose and unsound material and shall be adequate to support the *design load* taking into account temperature, precipitation, *construction* activities and other factors that may lead to changes of the properties of *soil* or *rock*.

4.2.6.3. Incorrect Placement of Shallow Foundations

(1) Where a *shallow foundation unit* has not been placed or located as indicated on the drawings,

(a) the error shall be corrected, or

(b) the design of the *foundation unit* shall be recalculated for the altered conditions by the *designer*.

4.2.6.4. Damaged Shallow Foundations

(1) Where a *shallow foundation unit* is damaged,

(a) it shall be repaired, or

(b) the *design* of the *foundation unit* shall be recalculated for the damaged condition by the *designer*.

4.2.7. Deep Foundations

4.2.7.1. General

(1) A *deep foundation unit* shall provide support for a *building* by transferring loads by end-bearing to a competent stratum at considerable depth below the structure, or by mobilizing resistance by adhesion or friction, or both, in the *soil* or *rock* in which it is placed.

4.2.7.2. Design for Deep Foundations

(1) *Deep foundation units* shall be designed in conformance with Subsection 4.2.4. and this Subsection.

(2) Where *deep foundation units* are load tested, as required in Clause 4.2.4.1.(1)(c), the determination of the number and type of load test and the interpretation of the results shall be carried out by a person especially qualified in this field of work.

(3) The design of *deep foundations* shall be determined on the basis of geotechnical considerations taking into account,

(a) the method of installation,

(b) the degree of inspection,

(c) the spacing of *foundation units* and group effects,

(d) other requirements of this Subsection, and

(e) the appropriate structural requirements of Section 4.1. and Subsections 4.3.1., 4.3.3. and 4.3.4.

(4) The portion of a *deep foundation unit* permanently in contact with *soil* or *rock* shall be structurally designed as a laterally supported compression member.

(5) The portion of a *deep foundation unit* that is not permanently in contact with *soil* or *rock* shall be structurally designed as a laterally unsupported compression member.

(6) The structural design of prefabricated *deep foundation units* shall allow for all stresses resulting from driving, handling and testing.

4.2.7.3. Tolerance in Alignment and Location

(1) Permissible deviations from the design alignment and the location of the top of *deep foundation units* shall be determined by design analysis and shall be indicated on the drawings.

4.2.7.4. Incorrect Alignment and Location

(1) Where a *deep foundation unit* has not been placed within the permissible deviations referred to in Article 4.2.7.3., the condition of the *foundation* shall be assessed by the *designer*.

4.2.7.5. Installation of Deep Foundations

(1) *Deep foundation units* shall be installed in such a manner as not to impair,

(a) the strength of the *deep foundation units* and the properties of the *soil* or *rock* on or in which they are placed beyond the calculated or anticipated limits,

(b) the integrity of previously installed *deep foundation units*, or

(c) the integrity of neighbouring *buildings*.

4.2.7.6. Damaged Deep Foundation Units

(1) Where inspection shows that a *deep foundation unit* is damaged or not consistent with design or good engineering practice,

(a) such a unit shall be reassessed by the *designer*, and

(b) any necessary changes shall be made and action taken as required.

4.2.8. Special Foundations

4.2.8.1. General

(1) Where special *foundation* systems are used, such systems shall conform to Subsection 4.2.4. and Sentence 4.1.1.4.(2).

4.2.8.2. Use of Existing Foundations

(1) Existing *foundations* may be used to support new or altered *buildings* provided they comply with all pertinent requirements of this Section.

Section 4.3. Design Requirements for Structural Materials

4.3.1. Wood

4.3.1.1. Design Basis for Wood

(1) *Buildings* and their structural members made of wood shall conform to CAN/CSA-O86, "Engineering Design in Wood".

4.3.1.2. Glue-Laminated Members

(1) Glued-laminated members shall be fabricated in plants conforming to CAN/CSA-O177-M, "Qualification Code for Manufacturers of Structural Glued-Laminated Timber".

4.3.1.3. Termites

(1) In areas known to be infested by termites, the requirements in Articles 9.3.2.9., 9.12.1.1. and 9.15.5.1. shall apply.

4.3.2. Plain and Reinforced Masonry

4.3.2.1. Design Basis for Plain and Reinforced Masonry

(1) *Buildings* and their structural members made of plain and reinforced masonry shall conform to CSA S304.1, "Design of Masonry Structures".

4.3.3. Plain, Reinforced and Prestressed Concrete

4.3.3.1. Design Basis for Plain, Reinforced and Prestressed Concrete

(1) *Buildings* and their structural members made of plain, reinforced or prestressed concrete shall conform to CSA A23.3, "Design of Concrete Structures".

4.3.4. Steel

4.3.4.1. Design Basis for Structural Steel

(1) *Buildings* and their structural members made of structural steel shall conform to CAN/CSA-S16, "Limit States Design of Steel Structures".

4.3.4.2. Design Basis for Cold Formed Steel

(1) *Buildings* and their structural members made of cold formed steel shall conform to CAN/CSA-S136, "North American Specification for the Design of Cold-Formed Steel Structural Members".

4.3.4.3. Steel Building Systems

(1) Steel *building* systems shall be manufactured by companies certified in accordance with the requirements of CSA-A660, "Certification of Manufacturers of Steel Building Systems".

4.3.5. Aluminum

4.3.5.1. Design Basis for Aluminium

(1) *Buildings* and their structural members made of aluminum shall conform to CAN3-S157, "Strength Design in Aluminum", using the loads stipulated in Section 4.1., in accordance with limit states design in Subsection 4.1.3.

4.3.6. Glass

4.3.6.1. Design Basis for Glass

(1) Glass used in *buildings* shall be designed in conformance with CAN/CGSB-12.20-M, "Structural Design of Glass for Buildings".

Section 4.4. Design Requirements for Special Structures

4.4.1. Air-Supported Structures

4.4.1.1. Design Basis for Air-Supported Structures

(1) The structural design of *air-supported structures* shall conform to CAN3-S367-M, "Air-Supported Structures" using the loads stipulated in Section 4.1., in accordance with limit states design in Subsection 4.1.3.

4.4.2. Parking Structures

4.4.2.1. Design Basis for Parking Structures

(1) Parking structures shall be designed in conformance with CAN/CSA-S413, "Parking Structures".

4.4.3. Guards Over Retaining Walls

4.4.3.1. Guards Over Retaining Walls

(1) Every retaining wall that is designated in Sentence 1.1.1.1.(1) of Division A shall be protected by *guards* on all open sides where the public has access to open space at the top of the retaining wall.

4.4.4. Anchor Systems on Building Exterior

4.4.4.1. Anchor Systems on Building Exterior

(1) Where maintenance and window cleaning operations are intended to be carried out on the exterior of a *building* described in Article 1.3.2.2. of Division A, anchor systems shall be provided where any portion of the roof is more than 8 m above adjacent ground level.

(2) Except as provided in Sentence (3), the anchor systems in Sentence (1) shall be designed, installed and tested in conformance with CSA Standard Z91, " Safety Code for Window Cleaning Operations".

(3) Other anchor systems may be used where such systems provide an equal level of safety.

(4) The anchor system material shall be made of stainless steel, or other corrosion resistant base material, or from steel that is hot dipped galvanised, in accordance with CAN/CSA-G164-M, "Hot Dip Galvanising of Irregularly Shaped Articles".

4.4.5. Manure Storage Tanks

4.4.5.1. Manure Storage Tanks

(1) Except as provided in this Subsection, manure storage tanks shall comply with the requirements of the National Farm Building Code of Canada.

(2) Manure storage tanks shall be constructed of steel, reinforced concrete or prestressed concrete.

(3) Manure storage tank walls, bases and appurtenances, including piping for the conveyance of manure and associated connections and joints, shall be designed and constructed to prevent leakage of contents.

(4) Concrete for manure storage tanks shall,

(a) be manufactured from Type 50 cement,

(b) have a 28-day strength of at least 32 MPa, and

(c) have a water/cement materials ratio of not more than 0.45.

(5) Manure storage tanks shall be placed on undisturbed *soil* free of any organic, deleterious and extraneous materials and capable of supporting the superimposed design loads from the tanks.

(6) Where granular *fills* are used between the bases of manure storage tanks and the undisturbed *soil*, the granular *fills* shall be compacted to a Standard Proctor density of not less than 95 per cent.

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PART 5
ENVIRONMENTAL SEPARATION

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5.10.1. Applicable Standards

Section 5.1. General

5.1.1. Scope

5.1.1.1. Scope

(1) The scope of this Part shall be as described in Subsection 1.1.2. of Division A.

5.1.2. Application

5.1.2.1. Exposure to Exterior Space or the Ground and Separation of Dissimilar Environments

(1) This Part applies to,

(a) *building* materials, components and assemblies exposed to exterior space or the ground, including those separating interior space from exterior space or separating interior space from the ground,

(b) *building* materials, components and assemblies separating environmentally dissimilar interior spaces, and

(c) site materials, components, assemblies and grading that may affect environmental loads on *building* materials, components and assemblies exposed to exterior space or the ground.

5.1.3. Definitions

5.1.3.1. Reserved

5.1.4. Resistance to Loads and Deterioration

5.1.4.1. Structural and Environmental Loads

(1) *Building* materials, components and assemblies that separate dissimilar environments or are exposed to the exterior shall be designed and constructed to provide sufficient capacity and integrity to resist or accommodate,

(a) all environmental loads, and effects of those loads, that may reasonably be expected having regard to,

  (i) the intended use of the *building*, and

  (ii) the environment to which the materials, components and assemblies are subject, and

(b) all structural loads, and effects of those loads, that may be reasonably expected.

(2) The design and construction required by Clause (1)(a) shall comply with Subsection 5.2.1.

(3) The design and construction required by Clause (1)(b) shall comply with Subsection 5.2.2., with regard to,

(a) materials, components and assemblies, and associated loads, that are identified in Part 4,

(b) air pressure loads imposed on *air barrier systems*,

(c) wind up-lift imposed on roofing, and

(d) hydrostatic pressure imposed on the means of protection from moisture in the ground.

(4) For materials, components, assemblies and loads to which Sentence (3) does not apply, the design and construction required by Clause 1(b) shall,

(a) comply with Subsection 5.2.2. for individual applicable loads and construction conforming to that design, or

(b) in the case of common materials, components and assemblies, and their installation, be based on proven past performance over a period of several years for individual applicable loads.

(5) Materials, components and assemblies separating dissimilar environments and assemblies exposed to the exterior, including their connections, that are subject to structural loads, shall,

(a) transfer such loads to the *building* structure without adverse effects on the performance of other materials, components or assemblies,

(b) not deflect to a degree that adversely affects the performance of other materials, components or assemblies,

(c) be designed, and constructed according to that design, to accommodate,

(i) the maximum relative structural movement that may reasonably be expected, and

(ii) construction tolerances that may reasonably be expected.

5.1.4.2. Resistance to Deterioration

(1) Except as provided in Sentence (2), materials used in *building* components and assemblies that separate dissimilar environments, or in assemblies exposed to the exterior, shall be,

(a) compatible with adjoining materials, and

(b) resistant to any mechanisms of deterioration that may reasonably be expected, given the nature, function and exposure of the materials.

(2) Material compatibility and deterioration resistance are not required where it can be shown that incompatibility or uncontrolled deterioration will not adversely affect any of,

(a) the health or safety of *building* users,

(b) the intended use of the *building*, or

(c) the operation of *building* services.

(3) Design and construction of assemblies separating dissimilar environments and assemblies exposed to the exterior shall be in accordance with good practice such as described in CSA S478, "Guideline on Durability in Buildings".

5.1.5. Other Requirements

5.1.5.1. Requirements in Other Parts of the Code

(1) Acoustical, structural and fire safety requirements shall comply with other Parts.

Section 5.2. Loads and Procedures

5.2.1. Environmental Loads and Design Procedures

5.2.1.1. Exterior Environmental Loads

(1) Above ground climatic loads shall be determined according to Supplementary Standard SB-1.

(2) Except as provided in Sentence (3), below ground exterior environmental loads not described in Supplementary Standard SB-1 shall be determined from existing geological and hydrological data or from site tests.

(3) Where local design and construction practice has shown *soil* temperature analysis to be unnecessary, *soil* temperatures need not be determined.

5.2.1.2. Interior Environmental Loads

(1) Interior environmental loads shall be determined in accordance with good engineering practice as described in Sentence 6.2.1.1.(1) based on the intended use of the space.

5.2.1.3. Environmental Load and Transfer Calculations

(1) Calculations related to the transfer of heat, air and moisture and the transmission of sound shall conform to good engineering practice such as that described in the ASHRAE Fundamentals Handbook.

(2) For the purposes of any analysis conducted to indicate conformance to the thermal resistance levels required in Article 5.3.1.2., *soil* temperatures shall be determined based on annual average *soil* temperature, seasonal amplitude of variation and attenuation of variation with depth.

(3) Wind load calculations shall conform to Subsection 4.1.7.

5.2.2. Structural Loads and Design Procedures

5.2.2.1. Determination of Structural Loads

(1) Where materials, components or assemblies that separate dissimilar environments or are exposed to the exterior, or their connections, are required to be designed for structural loads, these loads shall be determined in accordance with Part 4.

(2) The structural loads identified in Sentence (1) shall include,

(a) *dead loads* transferred from structural elements,

(b) wind, snow, rain, hydrostatic and earth pressures, as well as earthquake loads and effects,

(c) *live loads* due to use and *occupancy*, and

(d) loads due to thermal or moisture-related expansion and contraction, deflection, deformation, creep, shrinkage, settlement, and differential movement.

(3) Where materials, components or assemblies that separate dissimilar environments or are exposed to the exterior, or their connections, can be expected to be subject to loads or other effects not otherwise described in this Subsection or in Part 4, such loads or other effects shall be taken into account in the design based on the most applicable information available.

5.2.2.2. Wind Load and Other Air Pressure Loads

(1) This Article applies to the determination of wind load to be used in the design of materials, components and assemblies, including their connections, that separate dissimilar environments or are exposed to the exterior, where these are,

(a) subject to wind load, and

(b) required to be designed to resist wind load.

(2) Except as provided in Sentence (3), the wind load described in Sentence (1) shall be 100% of the specified wind load determined according to Part 4 and based on,

(a) the reference velocity pressure defined in Clause 4.1.7.1.(4), and

(b) the gust effect factor defined in Clause 4.1.7.1.(6).

(3) Where it can be shown by test or analysis that a material, component, assembly or connection described in Sentence (1) will be subject to less than 100% of the specified wind load, the wind load described in Sentence (1) shall be not less than the load determined by test or analysis.

5.2.2.3. Design Procedures

(1) Structural design shall be carried out in accordance with Subsection 4.1.3. and other applicable requirements in Part 4.

Section 5.3. Heat Transfer

5.3.1. Thermal Resistance of Assemblies

5.3.1.1. Required Resistance to Heat Transfer

(1) Except as provided in Sentence (2), where a *building* component or assembly will be subjected to an intended temperature differential, the component or assembly shall include materials to resist heat transfer or means to dissipate transferred heat in accordance with the remainder of this Subsection.

(2) The installation of materials to resist heat transfer in accordance with the remainder of this Subsection is not required where it can be shown that uncontrolled heat transfer will not adversely affect any of,

(a) the health or safety of *building* users,

(b) the intended use of the *building*, or

(c) the operation of *building* services.

5.3.1.2. Properties to Resist Heat Transfer

(1) Materials and components installed to provide the required resistance to heat transfer or the means implemented to dissipate heat shall,

(a) provide sufficient resistance or dissipation,

  (i) to minimize surface condensation on the warm side of the component or assembly,

  (ii) in conjunction with other materials and components in the assembly, to minimize condensation within the component or assembly,

  (iii) in conjunction with systems installed for space conditioning, to meet the interior design thermal conditions for the intended *occupancy*, and

  (iv) to minimize ice damming on sloped roofs, and

(b) take into account the conditions on either side of the environmental separator.

(2) Except as provided in Sentence (3), all metal-framed glazed assemblies separating interior *conditioned space* from interior unconditioned space or exterior space shall incorporate a thermal break to minimize condensation.

(3) Metal-framed glazed assemblies need not comply with Sentence (2) where these assemblies are,

(a) storm windows or doors, or

(b) windows or doors that are required to have a *fire-protection rating*.

5.3.1.3. Location and Installation of Materials Providing Thermal Resistance

(1) Where a material required by Article 5.3.1.1. is intersected by a *building* assembly, penetrated by a high conductance component or interrupted by expansion, control or construction joints, and where condensation is likely to occur at these intersections, penetrations or interruptions, sufficient thermal resistance shall be provided so as to minimize condensation at these locations.

(2) Materials providing required thermal resistance shall have sufficient inherent resistance to air flow or be positioned in the assembly so as to prevent convective air flow through and around the material.

(3) Spray-in-place polyurethane insulation shall be installed in accordance with the requirements of CAN/ULC-S705.2, "Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density, Installer's Responsibilities - Specification".

Section 5.4. Air Leakage

5.4.1. Air Barrier Systems

5.4.1.1. Required Resistance to Air Leakage

(1) Where a *building* component or assembly separates interior *conditioned space* from exterior space, interior space from the ground, or environmentally dissimilar interior spaces, the properties and position of the materials and components in those components or assemblies shall be such that they control air leakage or permit venting to the exterior so as to,

(a) provide acceptable conditions for the *building* occupants,

(b) maintain appropriate conditions for the intended use of the *building*,

(c) minimize the accumulation of condensation in and penetration of precipitation into the *building* component or assembly,

(d) control heat transfer to roofs where ice damming can occur, and

(e) not compromise the operation of *building* services.

(2) Except as provided in Sentence (3), an *air barrier system* shall be installed to provide the principal resistance to air leakage.

(3) An *air barrier system* is not required where it can be shown that uncontrolled air leakage will not adversely affect any of,

(a) the health or safety of *building* users,

(b) the intended use of the *building*, or

(c) the operation of *building* services.

5.4.1.2. Air Barrier System Properties

(1) Except as provided in Sentence (2), materials intended to provide the principal resistance to air leakage shall have an air leakage characteristic not greater than 0.02 L/(s·m^2) measured at an air pressure difference of 75 Pa.

(2) The air leakage limit specified in Sentence (1) is permitted to be increased where it can be shown that the higher rate of leakage will not adversely affect any of,

(a) the health or safety of *building* users,

(b) the intended use of the *building*, or

(c) the operation of *building* services.

(3) The *air barrier system* shall be continuous,

(a) across construction, control and expansion joints,

(b) across junctions between different *building* assemblies, and

(c) around penetrations through the *building* assembly.

(4) The structural design of *air barrier systems* installed in assemblies subject to air pressure loads shall comply with Article 5.1.4.1. and Subsection 5.2.2.

Section 5.5. Vapour Diffusion

5.5.1. Vapour Barriers

5.5.1.1. Required Resistance to Vapour Diffusion

(1) Where a *building* component or assembly is subjected to differentials in temperature and water vapour pressure, the properties and position of the materials and components in those components or assemblies shall be such that they control vapour diffusion or permit venting to the exterior so as to minimize accumulation of condensation in the *building* component or assembly.

(2) Except as provided in Sentence (3), a *vapour barrier* shall be installed to provide the principal resistance to water vapour diffusion.

(3) A *vapour barrier* is not required where it can be shown that uncontrolled vapour diffusion will not adversely affect any of,

(a) the health or safety of *building* users,

(b) the intended use of the *building*, or

(c) the operation of *building* services.

5.5.1.2. Vapour Barrier Properties and Installation

(1) The *vapour barrier* shall have sufficiently low permeance and shall be positioned in the *building* component or assembly so as to,

(a) minimize moisture transfer by diffusion, to surfaces within the assembly that would be cold enough to cause condensation at the design temperature and humidity conditions, or

(b) reduce moisture transfer by diffusion, to surfaces within the assembly that would be cold enough to cause condensation at the design temperature and humidity conditions, to a rate that will not allow sufficient accumulation of moisture to cause deterioration or otherwise adversely affect any of,

(i) the health or safety of *building* users,

(ii) the intended use of the *building*, or

(iii) the operation of *building* services.

(2) Coatings applied to gypsum wallboard to provide required resistance to vapour diffusion shall conform with the requirements of Sentence (1) when tested in accordance with CAN/CGSB-1.501-M, "Method for Permeance of Coated Wallboard".

(3) Coatings applied to materials other than gypsum wallboard to provide required resistance to vapour diffusion shall be shown to conform to the requirements of Sentence (1) when tested in accordance with ASTM E96, "Water Vapour Transmission of Materials" by the desiccant method (dry cup).

Section 5.6. Precipitation

5.6.1. Protection from Precipitation

5.6.1.1. Required Protection from Precipitation

(1) Except as provided in Sentence (2), where a *building* component or assembly is exposed to precipitation, the component or assembly shall,

(a) minimize ingress of precipitation into the component or assembly, and

(b) prevent ingress of precipitation into interior space.

(2) Protection from ingress of precipitation is not required where it can be shown that such ingress will not adversely affect any of,

(a) the health or safety of *building* users,

(b) the intended use of the *building*, or

(c) the operation of *building* services.

5.6.1.2. Protective Material and Component Properties

(1) Except as provided in Sentence (2), where western cedar shakes or shingles are installed to provide the required protection from precipitation,

(a) shakes shall be not less than No.1 or Handsplit grade, and

(b) shingles shall be not less than No. 2 grade.

(2) Where western cedar shakes or shingles are installed as undercoursing to provide required protection from precipitation on vertical assemblies, they shall be not less than No. 3 grade.

(3) Except as provided in Sentence (4), where eastern white cedar shingles are installed to provide the required protection from precipitation, they shall be not less less than B (clear) grade.

(4) Where eastern white shingles are installed as undercoursing to provide the required protection from precipitation on vertical assemblies, they shall be not less than C grade.

5.6.1.3. Installation of Protective Materials

(1) Where a material applied to a sloped or horizontal assembly is installed to provide required protection from precipitation and its installation is covered in the scope of one of the following standards, installation shall conform to the requirements of the respective standard:

(a) CAN/CGSB-37.51-M, "Application of Hot Applied Rubberized Asphalt for Roofing and Waterproofing",

(b) CGSB 37-GP-55M, "Application of Sheet Applied Flexible Polyvinyl Chloride Roofing Membrane",

(c) CAN3-A123.51-M, "Asphalt Shingle Application on Roof Slopes 1:3 and Steeper", or

(d) CAN3-A123.52-M, "Asphalt Shingle Application on Roof Slopes 1:6 to less than 1:3".

(2) Where masonry applied to vertical assemblies is installed to provide required protection from precipitation, installation shall conform to the requirements of CSA A371, "Masonry Construction for Buildings".

(3) Where protective materials are applied to assemblies to provide the required protection from precipitation, the materials shall be installed so as to shed precipitation or otherwise minimize its entry into the assembly and prevent its penetration through the assembly.

5.6.2. Sealing, Drainage, Accumulation and Disposal

5.6.2.1. Sealing and Drainage

(1) Except as provided in Sentence (2), materials, components, assemblies, joints in materials, junctions between components and junctions between assemblies exposed to precipitation shall be,

(a) sealed to prevent ingress of precipitation, or

(b) drained to direct precipitation to the exterior.

(2) Sealing or drainage are not required where it can be shown that the omission of sealing and drainage will not adversely affect any of,

(a) the health or safety of *building* users,

(b) the intended use of the *building*, or

(c) the operation of *building* services.

5.6.2.2. Accumulation and Disposal

(1) Where water, snow or ice can accumulate on a *building*, provision shall be made to minimize the likelihood of hazardous conditions arising from such accumulation.

(2) Where precipitation can accumulate on sloped or horizontal assemblies, provision shall be made for drainage conforming with Section 7.4.

(3) Where downspouts are provided and are not connected to a sewer, provisions shall be made to,

(a) divert the water from the *building*, and

(b) prevent *soil* erosion.

(4) Junctions between vertical assemblies, and sloped or horizontal assemblies, shall be designed and constructed to minimize the flow of water from the sloped or horizontal assembly onto the vertical assembly.

5.6.2.3. Solar Collector Systems

(1) A solar collector system is permitted to be installed above roofing materials conforming to Table 5.10.1.1.

Section 5.7. Surface Water

5.7.1. Protection from Surface Water

5.7.1.1. Prevention of Accumulation and Ingress

(1) Except as provided in Sentence (3), the *building* shall be located, the *building* site graded or catch basins installed so that *surface water* will not accumulate against the *building*.

(2) Except as provided in Sentence (3), the *foundation* walls shall be constructed so that *surface water* will not,

(a) enter the *building*, or

(b) damage moisture susceptible materials.

(3) *Buildings* specifically designed to accommodate accumulation of water at the *building* or the ingress of water need not comply with Sentence (1) or Clause (2)(a).

Section 5.8. Moisture in the Ground

5.8.1. Foundation and Floor Drainage

5.8.1.1. Required Drainage

(1) Except where a wall or floor is subject to continuous hydrostatic pressure, or unless it can be shown to be unnecessary, the bottom of every exterior *foundation* wall and every floor-on-ground shall be provided with drainage.

5.8.1.2. Drainage Materials and Installation

(1) Drainage shall be designed and installed to accommodate the drainage load.

5.8.2. Protection from Moisture in the Ground

5.8.2.1. Required Moisture Protection

(1) Except as provided in Sentence (2), where a *building* element separates interior space from the ground, materials, components or assemblies shall be installed to prevent moisture transfer into the space.

(2) Materials, components or assemblies need not be installed to prevent moisture transfer from the ground where it can be shown that such transfer will not adversely affect any of,

(a) the health or safety of *building* users,

(b) the intended use of the *building*, or

(c) the operation of *building* services.

5.8.2.2. Protective Material and Component Properties

(1) Except where it can be shown that lesser protection will not lead to adverse conditions, or as provided in Article 5.8.2.3., materials and components installed to provide required moisture protection shall conform to the requirements of this Article.

(2) Except as provided in Sentences (3) and (7), materials installed to provide the required moisture protection shall be capable of bridging,

(a) construction, control and expansion joints,

(b) junctions between different *building* assemblies, and

(c) junctions between *building* assemblies and elements penetrating *building* assemblies.

(3) Except as provided in Sentence (7), where the material installed to provide the required moisture protection is not capable of bridging construction, control and expansion joints, those joints shall be designed to maintain the continuity of the moisture protection.

(4) Materials and components installed to provide the required moisture protection shall have sufficiently low water permeance to resist moisture loads.

(5) Except as provided in Sentence (7), moisture protection shall be designed and constructed to resist design hydrostatic pressures as determined in accordance with Section 4.2.

(6) Except as provided in Sentence (7), materials covered in the scope of the following standards shall not be installed to provide the required resistance to moisture transfer:

(a) CGSB 37-GP-6Ma, "Asphalt, Cutback, Unfilled for Dampproofing", or

(b) CGSB 37-GP-18Ma, "Tar, Cutback, Unfilled for Dampproofing".

(7) Where the substrate is cast-in-place concrete, and a drainage layer is installed between the *building* assembly and the *soil*, and the assembly will not be subject to hydrostatic pressure,

(a) materials and components installed to provide the required resistance to moisture transfer need not conform to Sentences (2), (3), (5) and (6), and

(b) materials covered in the scope of the following standards are permitted to be installed to provide the required resistance to moisture transfer where those materials conform to the requirements of the standards:

  (i) CGSB 37-GP-6Ma, "Asphalt, Cutback, Unfilled, for Dampproofing", or

  (ii) CGSB 37-GP-18Ma, "Tar, Cutback, Unfilled, for Dampproofing".

5.8.2.3. Installation of Moisture Protection

(1) Except as provided in Sentence (2), where materials are installed to provide the required resistance to moisture transfer and their installation is covered in the scope of the following standards, installation shall conform to the waterproofing requirements of the respective standards:

(a) CAN/CGSB-37.3-M, "Application of Emulsified Asphalts for Dampproofing or Waterproofing",

(b) CGSB 37-GP-36M, "Application of Filled Cutback Asphalts for Dampproofing and Waterproofing",

(c) CGSB 37-GP-37M, "Application of Hot Asphalt for Dampproofing or Waterproofing", or

(d) CAN/CGSB-37.51-M, "Application of Hot Applied Rubberized Asphalt for Roofing and Waterproofing".

(2) Where the substrate is cast-in-place concrete, and a drainage layer is installed between the *building* assembly and the *soil*, and the assembly will not be subject to hydrostatic pressure,

(a) materials and components installed to provide the required resistance to moisture transfer and whose installation is covered in the scope of the standards listed in Sentence (1), are permitted to be installed in conformance with the dampproofing requirements of the standards listed in Sentence (1), or

(b) materials installed to provide the required resistance to moisture transfer and whose installation is covered in the scope of the following standards, shall be installed in conformance with the requirements of the respective standards:

(i) CGSB 37-GP-12Ma, "Application of Unfilled Cutback Asphalt for Dampproofing", or

(ii) CAN/CGSB 37.22-M, "Application of Unfilled Cutback Tar Foundation Coating for Dampproofing".

5.9. Sound Transmission

5.9.1. Protection from Noise

5.9.1.1. Sound Transmission Class

(1) Sound transmission class ratings shall be determined in accordance with ASTM E413, "Classification for Rating Sound Insulation", using the results from measurements in accordance with,

(a) ASTM E90, "Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements", or

(b) ASTM E336, "Measurement of Airborne Sound Insulation in Buildings".

5.9.1.2. Required Protection from Noise

(1) Except as provided in Sentence (2), a *dwelling unit* shall be separated from every other space in a *building* in which noise may be generated by construction providing a sound transmission class rating not less than 50, measured in accordance with the standards referenced in Sentence 5.9.1.1.(1).

(2) Construction separating a *dwelling unit* from an elevator hoistway or a refuse chute shall have a should transmission class rating not less than 55, measured in accordance with the standards referenced in Sentence 5.9.1.1.(1).

5.10. Standards

5.10.1. Applicable Standards

5.10.1.1. Compliance with Applicable Standards

(1) Except as provided in Sentences (2) and (3) and elsewhere in this Part, materials and components, and their installation, shall conform to the requirements of the applicable standards in Table 5.10.1.1. where those materials or components are,

(a) incorporated into environmental separators or assemblies exposed to the exterior, and

(b) installed to fulfill the requirements of this Part.

(2) The requirements for *flame-spread ratings* contained in thermal insulation standards shall be applied only as required in Part 3.

(3) Where a wired glass assembly is installed in a required *fire separation*, the assembly need not conform to CAN/CSA-A440, "Windows", or CAN/CSA-A440.1, "User Selection Guide to CSA Standard CAN/CSA-A440-00, Windows".

(4) Skylights not covered in the scope of CAN/CGSB-63.14-M, "Plastic Skylights", shall nonetheless conform to the performance requirements of that standard.

Table 5.10.1.1.
Standards Applicable to Environmental Separators and Assemblies Exposed to the Exterior

Forming Part of Sentence 5.10.1.1.(1)

COLUMN 1	COLUMN 2	COLUMN 3
Issuing Agency	**Document Number**	**Title of Document**
ANSI	A208.1	Particleboard, Mat-Formed
ANSI/ASME	B18.6.1	Wood Screws (Inch Series)
ASTM	A123 / A123M	Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products

COLUMN 1	COLUMN 2	COLUMN 3
Issuing Agency	**Document Number**	**Title of Document**
ASTM	A153 / A153M	Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM	A653 / A653M	Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM	C4	Clay Drain Tile and Perforated Clay Drain Tile
ASTM	C36 / C36M	Gypsum Wallboard
ASTM	C37 / C37M	Gypsum Lath
ASTM	C79 / C79M	Treated Core and Nontreated Core Gypsum Sheathing Board
ASTM	C126	Ceramic Glazed Structural Clay Facing Tile, Facing Brick, and Solid Masonry Units
ASTM	C212	Structural Clay Facing Tile
ASTM	C412M	Concrete Drain Tile (Metric)
ASTM	C442 / C442M	Gypsum Backing Board, and Gypsum Coreboard, and Gypsum Shaftliner Board
ASTM	C444M	Perforated Concrete Pipe (Metric)
ASTM	C588 / C588M	Gypsum Base for Veneer Plasters
ASTM	C630 / C630M	Water-Resistant Gypsum Backing Board
ASTM	C700	Vitrified Clay Pipe, Extra Strength, Standard Strength and Perforated
ASTM	C931 / C931M	Exterior Gypsum Soffit Board
ASTM	C960 / C960M	Predecorated Gypsum Board
ASTM	C1002	Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs
ASTM	C1177 / C1177M	Glass Mat Gypsum Substrate for Use as Sheathing
ASTM	C1178 / C1178M	Glass Mat Water-Resistant Gypsum Board Backing Panel
ASTM	C1395 / C1395M	Gypsum Ceiling Board
ASTM	C1396 / C1396M	Gypsum Board
ASTM	D2178	Asphalt Glass Felt Used in Roofing and Waterproofing
AWPA	M4	Care of Preservative-Treated Wood Products
BNQ	NQ3624-115	Polyethylene (PE) Pipe and Fittings - Flexible Corrugated Pipes for Drainage - Characteristics and Test Methods
CGSB	CAN/CGSB-11.3-M	Hardboard
CGSB	CAN/CGSB-11.5-M	Hardboard, Precoated, Factory Finished, for Exterior Cladding
CGSB	CAN/CGSB-12.1-M	Tempered or Laminated Safety Glass
CGSB	CAN/CGSB-12.2-M	Flat, Clear Sheet Glass
CGSB	CAN/CGSB-12.3-M	Flat, Clear Float Glass
CGSB	CAN/CGSB-12.4-M	Heat Absorbing Glass
CGSB	CAN/CGSB-12.5-M	Mirrors, Silvered
CGSB	CAN/CGSB-12.8	Insulating Glass Units
CGSB	CAN/CGSB-12.10-M	Glass, Light and Heat Reflecting
CGSB	CAN/CGSB-12.11-M	Wired Safety Glass
CGSB	19-GP-5M	Sealing Compound, One Component, Acrylic Base, Solvent Curing
CGSB	CAN/CGSB-19.13-M	Sealing Compound, One Component, Elastomeric, Chemical Curing
CGSB	19-GP-14M	Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing
CGSB	CAN/CGSB-19.24-M	Multicomponent, Chemical-Curing Sealing Compound
CGSB	CAN/CGSB-34.4-M	Siding, Asbestos-Cement, Shingles and Clapboards
CGSB	CAN/CGSB-34.5-M	Sheets, Asbestos-Cement, Corrugated
CGSB	CAN/CGSB-34.14-M	Sheets, Asbestos-Cement, Decorative
CGSB	CAN/CGSB-34.16-M	Sheets, Asbestos-Cement, Flat, Fully Compressed
CGSB	CAN/CGSB-34.17-M	Sheets, Asbestos-Cement, Flat, Semicompressed
CGSB	CAN/CGSB-34.21-M	Panels, Sandwich, Asbestos-Cement with Insulating Cores
CGSB	CAN/CGSB-34.22	Asbestos-Cement Drain Pipe
CGSB	CAN/CGSB-37.1-M	Chemical Emulsified Type, Emulsified Asphalt for Dampproofing
CGSB	CAN/CGSB-37.2-M	Emulsified Asphalt, Mineral Colloid Type, Unfilled, for Dampproofing and Waterproofing and for Roof Coatings
CGSB	CAN/CGSB-37.3-M	Application of Emulsified Asphalts for Dampproofing or Waterproofing
CGSB	CAN/CGSB-37.4-M	Fibrated, Cutback Asphalt, Lap Cement for Asphalt Roofing
CGSB	CAN/CGSB-37.5-M	Cutback Asphalt Plastic Cement
CGSB	37-GP-6Ma	Asphalt, Cutback, Unfilled, for Dampproofing
CGSB	CAN/CGSB-37.8-M	Asphalt, Cutback, Filled, for Roof Coating
CGSB	37-GP-9Ma	Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing
CGSB	37-GP-12Ma	Application of Unfilled Cutback Asphalt for Dampproofing
CGSB	CAN/CGSB-37.16-M	Filled, Cutback Asphalt for Dampproofing and Waterproofing
CGSB	37-GP-18Ma	Tar, Cutback, Unfilled, for Dampproofing
CGSB	37-GP-21M	Tar, Cutback, Fibrated, For Roof Coating
CGSB	CAN/CGSB-37.22-M	Application of Unfilled, Cutback Tar Foundation Coating for Dampproofing

COLUMN 1 Issuing Agency	COLUMN 2 Document Number	COLUMN 3 Title of Document
CGSB	37-GP-36M	Application of Filled Cutback Asphalt for Dampproofing or Waterproofing
CGSB	37-GP-37M	Application of Hot Asphalt for Dampproofing or Waterproofing
CGSB	CAN/CGSB-37.50-M	Hot Applied, Rubberized Asphalt for Roofing and Waterproofing
CGSB	CAN/CGSB-37.51-M	Application for Hot Applied Rubberized Asphalt for Roofing and Waterproofing
CGSB	37-GP-52M	Roofing and Waterproofing Membrane, Sheet Applied, Elastomeric
CGSB	CAN/CGSB-37.54	Polyvinyl Chloride Roofing and Waterproofing Membrane
CGSB	37-GP-55M	Application of Sheet Applied Flexible Polyvinyl Chloride Roofing Membrane
CGSB	37-GP-56M	Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing
CGSB	37-GP-64M	Mat Reinforcing, Fibrous Glass, for Membrane Waterproofing Systems and Built-up Roofing
CGSB	41-GP-6M	Sheets, Thermosetting Polyester Plastics, Glass Fiber Reinforced
CGSB	CAN/CGSB-41.24	Rigid Vinyl Siding, Soffits and Fascia
CGSB	CAN/CGSB-51.25-M	Thermal Insulation, Phenolic, Faced
CGSB	51-GP-27M	Thermal Insulation, Polystyrene, Loose Fill
CGSB	CAN/CGSB-51.32-M	Sheathing, Membrane, Breather Type
CGSB	CAN/CGSB-51.33-M	Vapour Barrier, Sheet, Excluding Polyethylene, for Use in Building Construction
CGSB	CAN/CGSB-51.34-M	Vapour Barrier, Polyethylene Sheet for Use in Building Construction
CGSB	CAN/CGSB-63.14-M	Plastic Skylights
CGSB	CAN/CGSB-82.1-M	Sliding Doors
CGSB	CAN/CGSB-82.5-M	Insulated Steel Doors
CGSB	CAN/CGSB-93.1-M	Sheet, Aluminum Alloy, Prefinished Residential
CGSB	CAN/CGSB-93.2-M	Prefinished Aluminum Siding, Soffits and Facsia for Residential Use
CGSB	CAN/CGSB-93.3-M	Prefinished Galvanized and Aluminum-Zinc Alloy Steel Sheet for Residential Use
CGSB	CAN/CGSB-93.4-M	Galvanized Steel and Aluminum-Zinc Alloy Coated Steel Siding, Soffits and Fascia, Prefinished, Residential
CSA	CAN/CSA-A23.1	Concrete Materials and Methods of Concrete Construction
CSA	CAN/CSA-A82.1-M	Burned Clay Brick (Solid Masonry Units Made From Clay or Shale)
CSA	A82.3-M	Calcium Silicate (Sand-Lime) Building Brick
CSA	A82.4-M	Structural Clay Load-Bearing Wall Tile
CSA	A82.5-M	Structural Clay Non-Load-Bearing Tile
CSA	CAN3-A82.8-M	Hollow Clay Brick
CSA	CAN/CSA-A82.27-M	Gypsum Board
CSA	A82.30-M	Interior Furring, Lathing and Gypsum Plastering
CSA	A82.31-M	Gypsum Board Application
CSA	CAN3-A93-M	Natural Airflow Ventilators for Buildings
CSA	CAN/CSA-A123.1-M	Asphalt Shingles Made from Organic Felt and Surfaced with Mineral Granules
CSA	A123.2	Asphalt Coated Roofing Sheets
CSA	CAN/CSA-A123.3	Asphalt Saturated Organic Roofing Felt
CSA	CAN/CSA-A123.4	Asphalt for Constructing Built-Up Roof Coverings and Waterproofing Systems
CSA	CAN/CSA-A123.5	Asphalt Shingles Made from Glass Felt and Surfaced with Mineral Granules
CSA	A123.17	Asphalt-Saturated Felted Glass-Fibre Mat for Use in Construction of Built-Up Roofs
CSA	CAN3-A123.51-M	Asphalt Shingle Application on Roof Slopes 1:3 and Steeper
CSA	CAN3-A123.52-M	Asphalt Shingle Application on Roof Slopes 1:6 to Less than 1:3
CSA	A165.1	Concrete Block Masonry Units
CSA	A165.2	Concrete Brick Masonry Units
CSA	A165.3	Prefaced Concrete Masonry Units
CSA	CAN3-A165.4-M	Autoclaved Cellular Units
CSA	A179	Mortar and Grout for Unit Masonry
CSA	CAN/CSA-A220.0-M	Performance of Concrete Roof Tiles
CSA	CAN/CSA-A220.1-M	Installation of Concrete Roof Tiles
CSA	A371	Masonry Construction for Buildings
CSA	CAN/CSA-A440	Windows
CSA	CAN/CSA-A440.1	User Selection Guide to CSA Standard CAN/CSA-A440-00, Windows
CSA	CAN/CSA-A3001	Cementitious Materials for Use in Concrete
CSA	CAN/CSA-B182.1	Plastic Drain and Sewer Pipe and Pipe Fittings
CSA	CAN/CSA-G40.21	Structural Quality Steel
CSA	G401	Corrugated Steel Pipe Products
CSA	O80 Series	Wood Preservation
CSA	O80.1	Preservative Treatment of All Timber Products by Pressure Processes
CSA	O80.2	Preservative Treatment of Lumber, Timber, Bridge Ties and Mine Ties by Pressure Processes
CSA	O80.9	Preservative Treatment of Plywood by Pressure Processes

COLUMN 1	COLUMN 2	COLUMN 3
Issuing Agency	**Document Number**	**Title of Document**
CSA	O80.15	Preservative Treatment of Wood for Building Foundation Systems, Basements and Crawl Spaces by Pressure Processes
CSA	O80.34	Preservative Treatment of Lumber and Timbers with Borates for Use Out of Ground Contact and Continuously Protected from Liquid Water
CSA	O115-M	Hardwood and Decorative Plywood
CSA	O118.1	Western Cedars Shakes and Shingles
CSA	O118.2-M	Eastern White Cedar Shingles
CSA	O121-M	Douglas Fir Plywood
CSA	CAN/CSA-O132.2 Series	Wood Flush Doors
CSA	O141	Softwood Lumber
CSA	O151	Canadian Softwood Plywood
CSA	O153-M	Poplar Plywood
CSA	CAN/CSA-O325.0	Construction Sheathing
CSA	O437.0	OSB and Waferboard
CSA	S478	Guideline on Durability in Buildings
ULC	CAN/ULC-S701	Thermal Insulation, Polystyrene, Boards and Pipe Covering
ULC	CAN/ULC-S702	Mineral Fibre Thermal Insulation for Buildings
ULC	CAN/ULC-S703	Cellulose Fibre Insulation (CFI) for Buildings
ULC	CAN/ULC-S704	Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced
ULC	CAN/ULC-S705.1	Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density - Material Specification
ULC	CAN/ULC-S705.2	Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density, Installers's Responsibilities - Specification
ULC	CAN/ULC-S706	Wood Fibre Thermal Insulation for Buildings

O. Reg. 350/06, Division B, Part 5.

PART 6
HEATING, VENTILATING AND AIR-CONDITIONING

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Section 6.1. General

6.1.1. Application

6.1.1.1. Scope

(1) The scope of this Part shall be as described in Subsection 1.1.2. of Division A.

(2) Where the method of operation of an existing heating, ventilating or *air-conditioning* system is altered, the repair, adjustment or component replacements that change the capacity or extent of safety of the system shall conform to this Code.

6.1.1.2. Application

(1) This Part applies to systems and equipment for heating, ventilating and *air-conditioning* services.

Section 6.2. Design and Installation

6.2.1. General

6.2.1.1. Good Engineering Practice

(1) Heating, ventilating and *air-conditioning* systems, including related mechanical refrigeration systems, shall be designed, constructed and installed to conform to good engineering practice appropriate to the circumstances such as described in,

(a) the ASHRAE Handbooks as follows:

  (i) Fundamentals,

  (ii) Refrigeration,

  (iii) HVAC Applications,

  (iv) HVAC Systems and Equipment, and

  (v) ANSI/ASHRAE/IESNA 90.1, "Energy Efficient Design of New Buildings Except Lowrise Residential Buildings".

(b) the CAN/CSA-F280-M, "Determining the Required Capacity of Residential Space Heating and Cooling Appliances", and the outside winter design temperatures shall conform to Supplementary Standard SB-1,

(c) the CAN/CSA-F326-M, "Residential Mechanical Ventilation Systems",

(d) the NFPA Fire Codes,

(e) the HRAI Digest,

(f) the Hydronics Institute Manuals,

(g) the SMACNA Manuals,

(h) the ACGIH Industrial Ventilation Manual,

(i) CAN/CSA-Z317.2, "Special Requirements for Heating, Ventilation, and Air Conditioning (HVAC) Systems in Health Care Facilities", and

(j) the Model National Energy Code for Buildings.

6.2.1.2. Design Indoor Air Temperatures

(1) *Buildings* classified as Group B, Division 2 or 3 *occupancies* or Group C *residential occupancies* that are intended for use in the winter months on a continuing basis shall be insulated and be equipped with heating facilities that are capable of maintaining an indoor air temperature of 22°C at the outside winter design temperature referred to in Article 6.2.1.8.

(2) All other *buildings* intended for occupancy in the winter months on a continuing basis should be insulated and shall be equipped with heating facilities to maintain a minimum indoor air temperature of 18°C or commensurate with the use of the *building* at the outside winter design temperature described in Article 6.2.1.8.

6.2.1.3. Structural Movement

(1) Mechanical systems and equipment shall be designed and installed to accommodate the maximum relative structural movement provided for in the *construction* of the *building*.

6.2.1.4. Installation Standards

(1) The installation of solid fuel-burning *appliances* for central heating systems shall comply with CAN/CSA-B365-M, "Installation Code for Solid Fuel-Burning Appliances and Equipment" and the manufacturer's installation instructions.

(2) The solid fuel-fired *appliances* in Sentence (1) shall conform to CAN/CSA-B366.1-M, "Solid Fuel-Fired Central Heating Appliances".

(3) The design and installation of earth energy systems shall conform to CAN/CSA-C448.2, "Design and Installation of Earth Energy Systems for Residential and Other Small Buildings", where such systems use groundwater, submerged heat exchangers or ground heat exchangers to serve,

(a) single *dwelling units*, or

(b) *buildings* where the *conditioned space* is not more than 1 400 m^2.

(4) The design and installation of earth energy systems shall conform to CAN/CSA-C448.1, "Design and Installation of Earth Energy Systems for Commercial and Institutional Buildings", where such systems use groundwater, submerged heat exchangers or ground heat exchangers to condition a floor space area more than 1400 m^2.

(5) The design and installation of solid fuel-burning *stoves*, *ranges* and *space heaters*, including the requirements for combustion air, shall conform to the requirements of CAN/CSA-B365-M, "Installation Code for Solid Fuel-Burning Appliances and Equipment" and the manufacturer's installation instructions.

(6) The design and installation of hydronic heating systems shall conform to,

(a) CAN/CSA-B214, "Installation Code for Hydronic Heating Systems", or

(b) good engineering practice appropriate to the circumstances such as described in Article 6.2.1.1.

6.2.1.5. Fireplaces

(1) Fireplaces shall conform to the requirements of Section 9.22.

6.2.1.6. Heat Recovery Ventilators

(1) Except as provided in Sentence (2), heat recovery ventilators with rated capacities of not less than 25 L/s and not more than 200 L/s shall be installed in accordance with Article 9.32.3.11.

(2) Where *electric space heating*, other than forced-air electric heating system, is provided in *buildings* of *residential occupancy* within the scope of Part 9, the mechanical ventilation system shall include heat recovery ventilators designed to provide the greater of,

(a) the minimum rated efficiency required by the *Energy Efficiency Act*, or

(b) a minimum 55% sensible heat recovery efficiency when tested to the low temperature thermal and ventilation performance test method set out in CAN/CSA-C439, "Test for Rating the Performance of Heat/Energy-Recovery Ventilators", at a Station 1 test temperature of -25°C at an air flow not less than 30 L/s.

6.2.1.7. Outside Design Conditions

(1) The outside conditions to be used in designing heating, ventilating and *air-conditioning* systems shall be determined in conformance with Supplementary Standard SB-1.

6.2.1.8. Installation – General

(1) Equipment requiring periodic maintenance and forming part of a heating, ventilating or *air-conditioning* system shall be installed with provision for access for inspection, maintenance, repair and cleaning.

(2) Mechanical equipment shall be provided with guards to prevent injury.

(3) Heating, ventilating or *air-conditioning* systems shall be protected from freezing if they may be adversely affected by freezing temperatures.

6.2.1.9. Expansion, Contraction and System Pressure

(1) Heating and cooling systems shall be designed to allow for expansion and contraction of the heat transfer fluid and to maintain the system pressure within the rated working pressure limits of all components of the system.

6.2.1.10. Asbestos

(1) Asbestos shall not be used in air distribution systems or equipment in a form or in a location where asbestos fibres could enter the air supply or return systems.

6.2.1.11. Access Openings

(1) Any covering of an access opening through which a person could enter shall be openable from the inside without the use of keys where there is a possibility of the opening being accidentally closed while the system or equipment is being serviced.

6.2.1.12. Combustible Tubing

(1) *Combustible* tubing for pneumatic controls may be used in *buildings* required to be of *noncombustible construction* providing it has an outside diameter not exceeding 10 mm.

6.2.2. Ventilation

6.2.2.1. Required Ventilation

(1) Except as provided in Sentence (3), all *buildings* shall be ventilated in accordance with this Part.

(2) Except in *storage garages* and *repair garages* covered by Article 6.2.2.3., the rates at which outdoor air is supplied in *buildings* by ventilation systems shall be not less than the rates required by ANSI/ASHRAE 62, "Ventilation for Acceptable Indoor Air Quality".

(3) Self-contained mechanical ventilation systems that serve only one *dwelling unit* and that conform to the requirements of Subsection 9.32.3. shall be considered to satisfy the requirements of this Article.

(4) *Live/work units* shall be mechanically ventilated in accordance with the requirements of Sentence (1).

6.2.2.2. Natural Ventilation

(1) Except as permitted by Sentence (2), the ventilation required by Article 6.2.2.1. shall be provided by mechanical ventilation except that it can be provided by natural ventilation or a combination of natural and mechanical ventilation in,

(a) *buildings* of other than *residential occupancy* having an *occupant load* of not more than one person per 40 m^2 during normal use,

(b) *buildings* of *industrial occupancy* where the nature of the process contained in them permits or requires the use of large openings in the *building* envelope even during the winter, or

(c) seasonal *buildings* not intended to be occupied during the winter.

(2) Where climatic conditions permit, *buildings* containing *occupancies* other than *residential occupancies*, may be ventilated by natural ventilation methods in lieu of mechanical ventilation where engineering data demonstrates that such a method will provide the required ventilation for the type of *occupancy*.

6.2.2.3. Ventilation of Storage and Repair Garages

(1) Except as provided in Sentences (4) and (6), an enclosed *storage garage* shall have a mechanical ventilation system designed to,

(a) limit the concentration of carbon monoxide to not more than 100 parts per million of air when measured between 900 mm and 1 200 mm from the floor, where the majority of the vehicles stored are powered by gasoline fuelled engines,

(b) limit the concentration of nitrogen dioxide to not more than 3 parts per million parts of air when installed in accordance with manufacturer's instructions, where the majority of the vehicles stored are powered by diesel fuelled engines, or

(c) provide, during operating hours, a continuous supply of outdoor air at a rate of not less than 3.9 L/s for each square metre of floor area.

(2) Mechanical ventilation systems provided in accordance with Clause (1)(a) shall be controlled automatically by carbon monoxide monitoring devices and systems provided in accordance with Clause (1)(b) shall be controlled automatically by nitrogen dioxide or other acceptable monitoring devices, located so as to provide full protection throughout the *storage garage*.

(3) Mechanical ventilation systems provided in accordance with Sentence (1) shall be designed such that the pressure in the *storage garage* is less than the pressure in adjoining *buildings* of other *occupancy*, or in adjacent portions of the same *building* having a different *occupancy*.

(4) In *storage garages* subject to the requirements of Sentence (1), where motor vehicles are parked by mechanical means, the ventilation requirements may be reduced by one half.

(5) Except as provided in Sentence (6), ticket and attendant booths of *storage garages* shall be pressurized with a supply of outdoor air.

(6) The requirements of Sentences (1) to (5) shall not apply to *open-air storeys* in a *storage garage*.

(7) A *repair garage* shall have a mechanical ventilation system designed to limit the exposure of workers to carbon monoxide to below the time weighted average concentration of 35 parts per million for a normal 8 hour workday or 40 hour work week.

(8) In a *repair garage*, when a repair bay is not immediately adjacent to an outside garage door opening, a system capable of providing continuous general ventilation of not less than 700 L/s per internal bay shall be provided.

(9) The general ventilation system described in Sentence (8) shall be designed to,

(a) operate continuously, or

(b) be controlled automatically by carbon monoxide monitoring devices, located so as to provide full protection throughout the *repair garage*.

(10) The general ventilation system described in Sentence (8) is not required when tail pipes of vehicles are directly connected to local mechanical exhaust systems that terminate outdoors.

6.2.2.4. Air Contaminants

(1) Air contaminants released within *buildings* shall be removed insofar as possible at their points of origin and shall not be permitted to accumulate in concentrations greater than permitted in the ACGIH Industrial Ventilation Manual.

(2) Systems serving spaces that contain sources of contamination and systems serving other occupied parts of the *building* but located in or running through spaces that contain sources of contamination shall be designed in such a manner as to prevent spreading of such contamination to other occupied parts of the *building*.

(3) Heating, ventilating and *air-conditioning* systems shall be designed to minimize growth of micro-organisms according to good engineering practice as described in 6.2.1.1.(1).

(4) Mechanical rooms containing refrigeration equipment shall be ventilated in accordance with CSA-B52, "Mechanical Refrigeration Code".

6.2.2.5. Hazardous Gases, Dusts or Liquids

(1) Systems serving spaces that contain hazardous gases, dusts or liquids shall be designed, constructed and installed in conformance with the provisions of the Fire Code made under the *Fire Protection and Prevention Act, 1997*, or in the absence of requirements pertinent to such systems in the Fire Code, to good engineering practice such as is described in the publications of the National Fire Protection Association and in the National Fire Code of Canada.

6.2.2.6. Commercial Cooking Equipment

(1) All commercial cooking equipment shall be provided with ventilation systems designed, constructed and installed to conform to NFPA 96, "Ventilation Control and Fire Protection of Commercial Cooking Operations", except as required by Sentence 3.6.3.1.(1) and Article 3.6.4.2.

(2) Fire protection systems for high efficiency, high temperature commercial cooking equipment using vegetable oil or animal fat shall conform to,

(a) UL 300, "Fire Extinguishing Systems for Protection of Restaurant Cooking Areas", or

(b) ULC/ORD-C1254.6, "Fire Testing of Restaurant Cooking Area Fire Extinguishing System Units".

6.2.2.7. Crawl Spaces and Attic or Roof Spaces

(1) Every crawl space and every *attic or roof space* shall be ventilated by natural or mechanical means.

6.2.3. Air Duct Systems

6.2.3.1. Application

(1) Except as provided in Sentence (2), this Subsection applies to the design, construction and installation of air duct distribution systems serving heating, ventilating and *air-conditioning* systems.

(2) This Subsection does not apply to the design, construction and installation of air duct distribution systems serving heating, ventilating and *air-conditioning* systems that serve individual *dwelling units* within the scope of Part 9.

6.2.3.2. Materials in Air Duct Systems

(1) Except as provided in Sentences (2) to (4) and in Article 3.6.4.3., all ducts, duct connectors, associated fittings and *plenums* used in air duct systems shall be constructed of steel, aluminum alloy, copper, clay, asbestos-cement or similar *noncombustible* material.

(2) Ducts, associated fittings and *plenums* are permitted to contain *combustible* material provided they,

(a) conform to the appropriate requirements for Class 1 duct materials in CAN/ULC-S110-M, "Test for Air Ducts",

(b) conform to Article 3.1.5.15. in a *building* required to be of *noncombustible construction*,

(c) conform to Subsection 3.1.9.,

(d) are used only in horizontal runs in a *building* required to be of *noncombustible construction*,

(e) are not used in vertical runs serving more than 2 *storeys* in a *building* required to be of *noncombustible construction*, and

(f) are not used in air duct systems in which the air temperature may exceed 120°C.

(3) Duct sealants shall have a *flame-spread rating* of not more than 25 and a smoke developed classification of not more than 50.

(4) Duct connectors that contain *combustible* materials and that are used between ducts and air outlet units shall,

(a) conform to the appropriate requirements for Class 1 air duct materials in CAN/ULC-S110-M, "Test for Air Ducts",

(b) be limited to 4 m in length,

(c) be used only in horizontal runs, and

(d) not penetrate required *fire separations*.

(5) Materials in Sentences (1) to (4) that when used in a location where they may be subjected to excessive moisture shall have no appreciable loss of strength when wet and shall be corrosion-resistant.

(6) All ductwork and fittings shall be constructed and installed in conformance with SMACNA Manuals and ASHRAE Handbooks.

(7) All duct materials and fittings shall be,

(a) suitable for exposure to the temperature and humidity of the air being conveyed, and

(b) resistant to corrosion due to contaminants in the air being conveyed in the duct.

6.2.3.3. Connections and Openings in Air Duct Systems

(1) Air duct systems shall have,

(a) tight-fitting connections throughout, and

(b) no openings other than those required for proper operation, inspection and maintenance of the system.

(2) Access openings shall be provided in duct systems to allow the removal of material that may accumulate in *plenums* and ducts.

6.2.3.4. Duct Coverings, Linings, Adhesives and Insulation

(1) Coverings, linings and associated adhesives and insulation of air ducts, *plenums* and other parts of air duct systems shall be of *noncombustible* material when exposed to heated air or radiation from heat sources that would result in the exposed surface exceeding a temperature of 120°C.

(2) When *combustible* coverings and linings, including associated adhesives and insulation, are used, they shall have a *flame-spread rating* of not more than 25 on any exposed surface or any surface that would be exposed by cutting through the material in any direction, and a smoke developed classification of not more than 50, except that the outer covering of ducts, *plenums* and other parts of air duct systems used within an assembly of *combustible construction* may have an exposed surface *flame-spread rating* of not more than 75 and may have a smoke developed classification greater than 50.

(3) *Combustible* coverings and linings in Sentence (2) shall not flame, glow, smoulder or smoke when tested in accordance with the method of test in ASTM C411, "Hot-Surface Performance of High-Temperature Thermal Insulation" at the maximum temperature to which the coverings and linings are to be exposed in service.

(4) Except as provided in Sentence (5), foamed plastic insulation shall not be used as part of an air duct or for insulating an air duct.

(5) Foamed plastic insulation may be used in a ceiling space that acts as a return air *plenum* provided the foamed plastic insulation is protected from exposure to the *plenum* in accordance with Article 3.1.5.12.

(6) *Combustible* coverings and linings of ducts, including associated adhesives and insulation, shall be interrupted at the immediate area of operation of heat sources in a duct system, such as electric resistance heaters or fuel-burning heaters or *furnaces*, and where the duct penetrates a *fire separation*.

(7) Linings of ducts shall be installed so that they will not interfere with the operation of volume or balancing dampers, *fire dampers*, *fire stop flaps* and other *closures*.

6.2.3.5. Underground Ducts

(1) Underground ducts shall,

(a) be constructed and installed with a slope to provide interior drainage to all low points,

(b) not be connected directly to a sewer, and

(c) be installed and constructed of materials in conformance with ASHRAE Handbooks, SMACNA Manuals and the HRAI Digest.

(2) A clean-out or pump-out connection shall be provided in an underground duct system at every low point of the duct system.

6.2.3.6. Fire Dampers

(1) *Fire dampers* shall conform to the requirements of Subsection 3.1.8.

6.2.3.7. Smoke Detector Control

(1) Air handling systems shall incorporate *smoke detector* control where required by Article 3.2.4.12.

6.2.3.8. Exhaust Ducts and Outlets

(1) Except as provided in Sentence (2), *exhaust ducts* of nonmechanical ventilating systems serving separate rooms or spaces shall not be combined.

(2) *Exhaust ducts* of nonmechanical ventilating systems serving similar *occupancies* may be combined immediately below the point of final delivery to the outside, such as at the base of a roof ventilator.

(3) *Exhaust ducts* of ventilating systems shall have provision for the removal of condensation where this may be a problem.

(4) Exhaust outlets shall be designed to prevent back draft under wind conditions.

(5) Except as permitted in Sentence (6), exhaust systems shall discharge directly to the outdoors.

(6) Exhaust systems are permitted to exhaust into a *storage garage*, provided,

(a) they serve rooms that are accessible only from that *storage garage*,

(b) the exhaust contains no contaminants that would adversely affect the air quality in the *storage garage*, and

(c) they are designed in accordance with Sentence 6.2.3.9.(3).

(7) *Exhaust ducts* connected to laundry drying equipment shall be,

(a) independent of other *exhaust ducts*,

(b) designed and installed so that the entire duct can be cleaned, and

(c) constructed of smooth corrosion-resistant material.

(8) Except as provided in Sentence (10) and except for self-contained systems serving individual *dwelling units*, *exhaust ducts* serving rooms containing water closets, urinals, basins, showers or slop sinks shall be independent of other *exhaust ducts*.

(9) Except as provided in Sentence (10) and except for self-contained systems serving individual *dwelling units*, *exhaust ducts* serving rooms containing residential cooking equipment shall be independent of other *exhaust ducts*.

(10) Two or more exhaust systems described in Sentences (8) and (9) may be interconnected or connected with *exhaust ducts* serving other areas of the *building* provided,

(a) the connections are made at the inlet of an exhaust fan, and all interconnected systems are equipped with suitable back pressure devices to prevent passage of odours from one system to another when the fan is not in operation, or

(b) the *exhaust ducts* discharge to a shaft that is served by an exhaust fan having a capacity that is equal to or greater than the combined capacity of the exhaust fans discharging to the *plenum* multiplied by the operation diversity factor, provided that the exhaust fan serving the shaft operates continuously.

(11) Where *exhaust ducts* containing air from *conditioned spaces* pass through or are adjacent to unconditioned spaces, the ducts shall be constructed to prevent condensation from forming inside or outside of the ducts.

(12) Where an *exhaust duct* system is used for smoke removal in a high *building*, the requirements of Article 3.2.6.10. shall apply.

(13) Where *exhaust duct* systems from more than one *fire compartment* are connected to an *exhaust duct* in a *vertical service space*, the requirements of Article 3.6.4.3 shall apply.

(14) Except as provided in Sentence (15), exhaust air shall be provided at a rate not less than 24 L/s for each water closet, urinal, shower or slop sink.

(15) Exhaust air shall be provided for *fixtures* in *dwelling units* in accordance with ANSI/ASHRAE 62, "Ventilation for Acceptable Indoor Air Quality".

(16) Except for wash basins (lavatories), sanitary facilities in a *food premises* shall be mechanically ventilated and shall be capable of exhausting air at the rate of not less than 24 L/s for each sanitary fixture listed in Sentence (17).

(17) The mechanical ventilation described in Sentence (16) applies to rooms containing water closets, urinals, basins, showers or slop sinks.

6.2.3.9. Interconnection of Systems

(1) In a *residential occupancy*, air from one *suite* shall not be circulated to any other *suite* or to a *public corridor* or public stairway.

(2) Except as permitted by Sentence (3) and Sentence 6.2.3.8.(6), air duct systems serving *storage garages* shall not be directly interconnected with other parts of the *building*.

(3) *Exhaust ducts* referred to in Sentence 6.2.3.8.(8) may exhaust through an enclosed *storage garage* prior to exhausting to the outdoors provided,

(a) the *storage garage* exhaust system runs continuously,

(b) the capacity of the *storage garage* exhaust system is equal to or exceeds the volume of the exhaust entering the garage, and

(c) a leakage rate 1 smoke/fire damper rated in accordance with CAN/ULC-S112.1-M, "Leakage Rated Dampers for Use in Smoke Control Systems", is provided near the duct outlet location in the *storage garage* to prevent air from the *storage garage* from entering the exhaust ductwork system in the event the *building's* exhaust fan is shut down.

(4) Except for Sentence 3.3.1.4.(4) and Sentences (5) and (6), a *public corridor* or corridor serving the public shall not be used as a portion of a supply, return or exhaust air system serving adjoining areas, other than as part of a supply air system serving toilet rooms, bathrooms, shower rooms and similar auxiliary spaces opening directly to the *public corridor* or corridor used by the public.

(5) A *public corridor* may be used as part of an engineered smoke control system.

(6) Infiltration due to corridor pressurization is permitted into a *residential occupancy* from a *public corridor*.

6.2.3.10. Ducts in Exits

(1) Duct penetration of *fire separations* separating *exits* from the remainder of the *building* shall be in accordance with Article 3.4.4.4.

6.2.3.11. Make-up Air

(1) In ventilating systems that exhaust air to the outdoors, provision shall be made for the admission of a supply of make-up air in sufficient quantity so that the operation of the exhaust system and other exhaust equipment or combustion equipment is not adversely affected.

(2) Make-up air facilities required by Sentence (1) shall be interlocked with the exhaust devices they serve so that both operate together.

(3) Where make-up air facilities are intended to introduce air directly from the outdoors to occupied parts of the *building* in winter, they shall incorporate means of tempering that air to maintain the indoor design temperature.

6.2.3.12. Supply, Return, Intake and Exhaust Air Openings

(1) Supply, return and exhaust air openings located less than 2 000 mm above the floor in rooms or spaces in *buildings* shall be protected by grilles having openings of a size that will not allow the passage of a 15 mm diameter sphere.

(2) Outdoor air intakes and exhaust outlets on the exterior of *buildings* shall be designed or located so that the air entering the *building* system will not contain more contaminants than the normal exterior air of the locality in which the *building* is situated.

(3) Exterior openings for outdoor air intakes and exhaust outlets shall be shielded from the entry of snow and rain and shall be fitted with corrosion-resistant screens of mesh having openings not larger than 15 mm, except where experience has shown that climatic conditions require larger openings to avoid icing over of the screen openings.

(4) Screens required in Sentence (3) shall be accessible for maintenance.

(5) *Combustible* grilles, diffusers and other devices for supply, return and exhaust air openings in rooms shall conform to the *flame-spread rating* and smoke developed classification requirements for the interior finish of the surface on which they are installed.

6.2.3.13. Filters and Odour Removal Equipment

(1) Air filters for air duct systems shall conform to the requirements for Class 2 air filter units as described in CAN4-S111, "Fire Tests For Air Filter Units".

(2) When electrostatic-type filters are used, they shall be installed so as to ensure that the electric circuit is automatically de-energized when filter access doors are opened and in *dwelling units* when the system circulating fan is not operating.

(3) When odour removal equipment of the adsorption type is used it shall be,

(a) installed to provide access so that adsorption material can be reactivated or renewed, and

(b) protected from dust accumulation by air filters installed on the inlet side.

(4) Facilities for flushing and drainage shall be provided where filters are designed to be washed in place.

6.2.3.14. Air Washers and Evaporative Cooling Sections or Towers

(1) The filter and water evaporation medium of every air washer and evaporative cooling section enclosed within a *building* shall be made of *noncombustible* material.

(2) Sumps for air washer and evaporative cooling sections shall be constructed and installed so that they can be flushed and drained.

(3) Evaporative cooling sections or towers shall comply with the requirements of NFPA 214, "Water-Cooling Towers".

6.2.3.15. Fans and Associated Air Handling Equipment

(1) Fans for heating, ventilating and *air-conditioning* systems shall be located and installed so that their operation,

(a) does not adversely affect the draft required for proper operation of fuel-fired *appliances*, and

(b) does not allow the air in the air duct system to be contaminated by air or gases from the *boiler*-room or *furnace*-room.

(2) Fans and associated air handling equipment, such as air washers, filters and heating and cooling units, when installed on the roof or elsewhere outside the *building*, shall be of a type designed for outdoor use.

6.2.3.16. Vibration Isolation Connectors

(1) Vibration isolation connectors in air duct systems shall be *noncombustible*, except that *combustible* fabric connectors are permitted provided they,

(a) do not exceed 250 mm in length,

(b) comply with the flame-resistance requirements of CAN/ULC-S109, "Flame Tests of Flame-Resistant Fabrics and Films", and

(c) are not used in a location where they are exposed to heated air or radiation from heat sources that may cause the exposed surface to exceed a temperature of 120°C.

6.2.3.17. Tape

(1) Tape used for sealing joints in air ducts, *plenums* and other parts of air duct systems shall meet the flame-resistance requirements for fabric in CAN/ULC-S109, "Flame Tests of Flame-Resistant Fabrics and Films".

6.2.3.18. Construction and Installation of Ducts and Plenums

(1) Rectangular panels in *plenums* and ducts more than 300 mm wide shall be shaped to provide sufficient stiffness.

(2) Where the installation of heating *supply ducts* in walls and floors creates a space between the duct and construction material, the space shall be fire stopped with *noncombustible* material at each end.

(3) Ducts shall be securely supported by metal hangers, straps, lugs or brackets, except that where zero clearance is permitted, wooden brackets may be used.

(4) All round duct joints shall be tight-fitting and lapped not less than 25 mm.

(5) Rectangular duct connections shall be made with S and drive cleats or equivalent mechanical connections.

(6) Trunk *supply ducts* shall not be nailed directly to wood members.

(7) Branch ducts shall be supported at suitable spacings to maintain alignment and prevent sagging.

(8) Ducts in or beneath concrete slabs-on-ground shall be watertight, corrosion-, decay- and mildew-resistant.

(9) Where a *supply* or *return duct* is not protected by an insulated exterior wall or where the duct is exposed to an unheated space it shall be insulated to prevent condensation.

6.2.3.19. Clearances of Ducts and Plenums

(1) The clearances from *combustible* material and supply *plenums*, *supply ducts*, boots and register boxes of heating systems shall conform to the requirements of Subsection 6.2.4.

6.2.3.20. Return-Air System

(1) The return-air system shall be designed to handle the entire air supply.

(2) Where any part of a *return duct* will be exposed to radiation from the *furnace* heat exchanger or other radiating part within the *furnace*, such part of a *return duct* directly above or within 600 mm of the outside *furnace* casing shall be *noncombustible*.

(3) *Return ducts* serving solid fuel-fired *furnaces* shall be constructed of *noncombustible* material.

(4) Where *combustible return ducts* are permitted, they shall be lined with *noncombustible* material below floor registers, at the bottom of vertical ducts and under *furnaces* having a bottom return.

(5) The return-air system shall be designed so that the negative pressure from the circulating fan cannot affect the *furnace* combustion air supply nor draw combustion products from joints or openings in the *furnace* or *flue pipe*.

(6) Return-air inlets shall not be installed in an enclosed room or crawl space that provides combustion air to a fuel-fired *appliance*.

6.2.4. Air Ducts for Low Capacity Systems

6.2.4.1. Application

(1) The requirements of this Subsection apply to the design, construction and installation of air duct distribution systems serving heating, ventilating and *air-conditioning* systems that serve individual *dwelling units* within the scope of Part 9.

6.2.4.2. Duct Design

(1) Materials in *supply ducts* shall conform to Article 6.2.3.2.

(2) Galvanized steel or aluminum *supply ducts* shall conform to Table 6.2.4.2.

(3) The design of fitting for ducts shall conform to SMACNA, "HVAC Duct Construction Standards - Metal and Flexible", except that metal thickness shall conform to Table 6.2.4.2.

Table 6.2.4.2.
Minimum Metal Thickness of Ducts

Forming Part of Sentence 6.2.4.2.(2)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5
Type of Duct	Maximum Diameter, mm	Maximum Width or Depth, mm	Minimum Metal Thickness, mm	
			Duct Material	
			Galvanized Steel	Aluminum
Round ducts serving single *dwelling units*	125 or less	---	0.254	0.30
Round	350	---	0.33	0.30
	over 350	---	0.41	0.41
Rectangular, enclosed	---	350	0.33	0.30
	---	over 350	0.41	0.41
Rectangular, not enclosed, for single *dwelling units*, with required clearance up to 12 mm	---	350	0.33	0.41
	---	over 350	0.41	0.48
Rectangular, not enclosed, with required clearance of more than 12 mm	---	350	0.41	0.41
	---	over 350	0.48	0.48

6.2.4.3. Construction and Installation of Ducts and Plenums

(1) Rectangular panels in *plenums* and ducts more than 300 mm wide shall be shaped to provide sufficient stiffness.

(2) Where the installation of heating *supply ducts* in walls and floors creates a space between the duct and construction material, the space shall be fire stopped with *noncombustible* material at each end.

(3) Ducts shall be securely supported by metal hangers, straps, lugs or brackets, except that where zero clearance is permitted, wooden brackets may be used.

(4) All round duct joints shall be tight-fitting and lapped not less than 25 mm.

(5) Rectangular duct connections shall be made with S and drive cleats or equivalent mechanical connections.

(6) Trunk *supply ducts* shall not be nailed directly to wood members.

(7) Branch ducts shall be supported at suitable spacings to maintain alignment and prevent sagging.

(8) *Combustible* ducts in concrete slabs-on-ground that are connected to a *furnace* supply *plenum* shall be located not closer than 600 mm to that *plenum* and not less than 600 mm from its connection to a riser or register.

(9) Ducts in or beneath concrete slabs-on-ground shall be watertight, corrosion-, decay- and mildew-resistant.

(10) Where a *supply* or *return duct* is not protected by an insulated exterior wall or where the duct is exposed to an unheated space it shall be insulated to provide a thermal resistance of not less than RSI 2.1.

(11) Ductwork passing through unconditioned spaces shall have all joints taped or be otherwise sealed to ensure that the ducts are airtight throughout their length.

(12) Underground ducts shall,

(a) be constructed and installed with a slope to provide interior drainage to all low points,

(b) not be connected directly to a sewer, and

(c) be installed and constructed of materials in conformance with ASHRAE Handbooks, SMACNA Manuals and the HRAI Digest.

(13) A clean-out or pump-out connection shall be provided in an underground duct system at every low point of the duct system.

6.2.4.4. Warm-Air Supply Outlets

(1) In a *dwelling unit*, a warm-air supply outlet shall be provided in each finished room that is located adjacent to unheated space, exterior air or exterior soil.

(2) Except as provided in Sentence (3), when a room described in Sentence (1) is located adjacent to exterior walls, such outlets shall be located so as to bathe at least one exterior wall or window with warm air, except in bathrooms, utility rooms or kitchens, where this may not be practical.

(3) Where the heating system is also designed to provide ventilation air, ceiling outlets or outlets located high on interior walls may be installed provided the outlets are,

(a) designed for this purpose, and

(b) installed with diffusers.

(4) At least one warm-air supply outlet shall be provided for each 40 m² of floor surface area in unfinished *basements* serving *dwelling units*, located so as to provide adequate distribution of warm air throughout the *basement*.

(5) At least one warm-air supply outlet shall be provided for each 80 m² of floor surface area in heated crawl spaces serving *dwelling units*, and it shall be located so as to provide adequate distribution of warm-air throughout the crawl space.

(6) Except for pipeless *furnaces* and floor *furnaces*, the capacity of warm-air supply outlets serving *dwelling units* shall be not less than the design heat loss from the area served and shall not exceed 3 kW per outlet.

(7) In *basements* and heated crawl spaces, the calculated heat gain from the *supply ducts* and *plenum* surfaces may be considered in calculating the design heat loss.

(8) The temperature of supply air at the warm-air supply outlets shall not exceed 70°C.

(9) Warm-air supply outlets located in finished areas shall be provided with diffusers and adjustable openings and shall not be located on a *furnace plenum*.

(10) Air duct systems serving *storage garages* shall not be interconnected with other parts of the *building*.

6.2.4.5. Concrete Slabs-on-Ground

(1) Warm-air supply systems for *buildings* of *residential occupancy* built on concrete slabs-on-ground,

(a) shall be installed in the slab, and

(b) shall be of the perimeter loop type or radial perimeter type.

6.2.4.6. Adjustable Dampers and Balance Stops

(1) All branch *supply ducts* for residential systems shall be equipped with volume control dampers at the boot to permit balancing or shall be fitted with a diffuser incorporating an adjustable and lockable volume control device that can be set in a fixed position.

6.2.4.7. Return-Air System

(1) The return-air system shall be designed to handle the entire air supply.

(2) Except as provided in Sentences (3) and (4), *return ducts* shall be constructed of material having a surface *flame-spread rating* of not more than 150.

(3) Where any part of a *return duct* will be exposed to radiation from the *furnace* heat exchanger or other radiating part within the *furnace*, such part of a *return duct* directly above or within 600 mm of the outside *furnace* casing shall be *noncombustible*.

(4) *Return ducts* serving solid fuel-fired *furnaces* shall be constructed of *noncombustible* material.

(5) *Combustible return ducts* shall be lined with *noncombustible* material below floor registers, at the bottom of vertical ducts and under *furnaces* having a bottom return.

(6) Spaces between studs and joists used as *return ducts* shall be separated from the unused portions of such spaces by tight-fitting metal stops or wood blocking.

(7) A vertical *return duct* shall have openings to return air on not more than 1 floor.

(8) A *public corridor* shall comply with Sentences 6.2.3.9.(4) and (5).

(9) The return-air system shall be designed so that the negative pressure from the circulating fan cannot affect the *furnace* combustion air supply nor draw combustion products from joints or openings in the *furnace* or *flue pipe*.

(10) Return-air from a *dwelling unit* shall not be recirculated to any other *dwelling unit*.

(11) Except for floor levels that are less than 900 mm above or below an adjacent floor level that is provided with a return-air inlet, at least one return-air inlet shall be provided in each floor level in a *dwelling unit*.

(12) Provision shall be made for the return of air from all rooms by leaving gaps beneath doors, using louvred doors or installing *return duct* inlets.

(13) Return-air inlets shall not be installed in an enclosed room or crawl space that provides combustion air to a *furnace*.

6.2.4.8. Coverings, Linings and Insulation

(1) Foamed plastic insulation may be used in a ceiling space that acts as a return air *plenum* provided the foamed plastic insulation is protected from exposure to the *plenum* in accordance with Article 3.1.5.12.

(2) Linings of ducts shall be installed so that they will not interfere with the operation of volume or balancing dampers.

6.2.4.9. Tape

(1) Tape used for sealing joints in air ducts, *plenums* and other parts of air duct systems shall meet the flame-resistance requirements for fabric in CAN/ULC-S109, "Flame Tests of Flame-Resistant Fabrics and Films".

6.2.4.10. Clearances of Ducts and Plenums

(1) Where the *plenum* clearance is 75 mm or less, the clearance between a *supply duct* and *combustible* material shall,

(a) be equal to the required *plenum* clearance within 450 mm of the *plenum*, and

(b) be not less than 12 mm at a distance of 450 mm or more from the *plenum*, except that this clearance may be reduced to zero beyond a bend or offset in the duct sufficiently large to shield the remainder of the duct from direct radiation from the *furnace* heat exchanger.

(2) Where the *plenum* clearance is more than 75 mm but not more than 150 mm, the clearance between a *supply duct* and *combustible* material shall,

(a) be equal to the required *plenum* clearance within a horizontal distance of 1 800 mm of the *plenum*, and

(b) be not less than 12 mm at a horizontal distance of 1 800 mm or more from the *plenum*, except that this distance may be reduced to zero beyond a bend or offset in the duct sufficiently large to shield the remainder of the duct from direct radiation from the *furnace* heat exchanger.

(3) Where the *plenum* clearance is more than 150 mm, the clearance between a *supply duct* and *combustible* material shall,

(a) be equal to the required *plenum* clearance within a horizontal distance of 1 000 mm of the *plenum*,

(b) be not less than 150 mm within a horizontal distance between 1 000 mm and 1 800 mm from the *plenum*, and

(c) be not less than 25 mm at a horizontal distance of 1 800 mm or more from the *plenum*, except that this distance may be reduced to 8 mm beyond a bend or offset in the duct sufficiently large to shield the remainder of the *supply duct* from direct radiation from the *furnace* heat exchanger.

(4) Where a register is installed in a floor directly over a pipeless *furnace*, a double-walled register box with not less than 100 mm between walls, or a register box with the warm-air passage completely surrounded by the cold-air passage, shall be permitted in lieu of the clearances listed in Sentences (1), (2) and (3).

6.2.4.11. Exhaust Ducts and Outlets

(1) Where an *exhaust duct* passes through or is adjacent to unheated space, the duct shall be insulated to prevent moisture or condensation in the duct.

(2) Exhaust outlets shall be designed to prevent back draft under wind conditions.

(3) *Exhaust ducts* directly connected to laundry drying equipment shall be independent of other *exhaust ducts*.

(4) Exhaust systems shall discharge directly to the outdoors.

6.2.4.12. Make-up Air

(1) In ventilating systems that exhaust air to the outdoors, provision shall be made for the admission of a supply of make-up air in sufficient quantity so that the operation of the exhaust system and other exhaust equipment or combustion equipment is not adversely affected.

(2) Except as provided in Sentence (3), when electric resistance heating is used to temper make-up air required in Sentence (1) in *buildings* of *residential occupancy* within the scope of Part 9, the energy rating for windows and sliding glass doors shall conform to the requirements of Article 12.3.2.8. and the minimum thermal resistance of insulation to be installed shall conform to Column 4 of Table 12.3.2.1.

(3) Sentence (2) does not apply where,

(a) *electric space heating* is provided, or

(b) a heat recovery ventilator meeting the minimum rating requirements of Article 6.2.1.6. is installed.

6.2.4.13. Supply, Return, Intake and Exhaust Air Openings

(1) Supply, return and exhaust air openings in rooms or spaces shall be protected by grilles having openings of a size that will not allow the passage of a 15 mm diameter sphere.

(2) Outdoor air intakes and exhaust outlets at the *building* exterior shall be designed or located so that the air entering the *building* system will not contain more contaminants than the normal exterior air.

(3) Exterior openings for outdoor air intakes and exhaust outlets shall be shielded from the entry of snow and rain and shall be fitted with corrosion-resistant screens of mesh not larger than 15 mm, except where climatic conditions may require larger openings.

(4) Screens required in Sentence (3) shall be accessible for maintenance.

(5) *Combustible* grills, diffusers and other devices for the supply and return air openings installed in walls and ceilings shall have a *flame-spread rating* of,

(a) not more than 200 in bathrooms, and

(b) not more than 150 in rooms or spaces other than bathrooms.

6.2.4.14. Air Filters and Equipment

(1) Air filters for air duct systems shall conform to the requirements for Class 2 air filter units as described in CAN4-S111, "Fire Tests For Air Filter Units".

(2) When electrostatic-type filters are used, they shall be installed so as to ensure that the electric circuit is automatically de-energized when filter access doors are opened or when the system circulating fan is not operating.

(3) When odour removal equipment of the adsorption type is used it shall be,

(a) installed to provide access so that adsorption material can be reactivated or renewed, and

(b) protected from dust accumulation by air filters installed on the inlet side.

6.2.5. Heating Appliances, General

6.2.5.1. Location of Appliances

(1) Except for *appliances* installed in *dwelling units*, fuel-fired heating *appliances* shall be located, enclosed or separated from the remainder of the *building* in conformance with Section 3.6.

6.2.5.2. Appliances Installed Outside the Building

(1) Fuel-fired *appliances* installed outside a *building* shall be,

(a) designed and constructed for outdoor use,

(b) installed not less than 1 200 mm from the property line, measured horizontally, and

(c) installed not less than 3 m from an adjacent wall of the same *building* when such wall contains an opening or openings within 3 *storeys* above and 5 m horizontally from the *appliance*, unless such openings are protected by a *closure* assembly having a 45 min *fire-protection rating* determined in conformance with Article 3.1.8.4., or by wired glass conforming to Article 3.1.8.14.

6.2.6. Incinerators

6.2.6.1. Applicable Standard

(1) The design, construction, installation and *alteration* of every indoor incinerator shall conform to NFPA 82, "Incinerators, Waste and Linen Handling Systems and Equipment".

6.2.7. Unit Heaters

6.2.7.1. Clearances

(1) Every *unit heater* using either steam or hot water as the heating medium shall be installed such that the clearances between the *appliance* and adjacent *combustible* material conform to Table 6.2.9.3.

6.2.8. Radiators and Convectors

6.2.8.1. Lining or Backing

(1) Every steam or hot water radiator and convector located in a recess or concealed space or attached to the face of a wall of *combustible construction* shall be provided with a *noncombustible* lining or backing.

(2) Every steam or hot water radiator and convector shall be installed to conform to the clearance requirements of Table 6.2.9.3.

6.2.9. Piping for Heating and Cooling Systems

6.2.9.1. Piping Materials and Installation

(1) Piping shall be made from materials designed to withstand the effects of temperatures and pressures that may occur in the system.

(2) Every pipe used in a heating or *air-conditioning* system shall be installed to allow for expansion and contraction due to temperature changes.

(3) Supports and anchors for piping in a heating or *air-conditioning* system shall be designed and installed to ensure that undue stress is not placed on the supporting structure.

6.2.9.2. Insulation and Coverings

(1) Insulation and coverings on pipes shall be composed of material suitable for the operating temperature of the system to withstand deterioration from softening, melting, mildew and mould.

(2) Insulation and coverings on pipes in which the temperature of the fluid exceeds 120°C,

(a) shall be made of *noncombustible* material, or

(b) shall not flame, glow, smoulder or smoke when tested in accordance with the method of test ASTM C411, "Hot-Surface Performance of High-Temperature Thermal Insulation", at the maximum temperature to which such insulation or covering is to be exposed in service.

(3) Except as provided in Sentence (7), where *combustible* insulation is used on piping in a *horizontal* or *vertical service space*, the insulation and coverings on such pipes shall have a *flame-spread rating* throughout the material of not more than 25 in *buildings* of *noncombustible construction* and not more than 75 in *buildings* of *combustible construction.*

(4) Except as provided in Sentence (7), insulation and coverings on piping located in rooms and spaces other than the *service spaces* described in Sentence (3) shall have a *flame-spread rating* of not more than that required for the interior finish for the ceiling of the room or space.

(5) Except as provided in Sentence (7), where *combustible* insulation and covering is used on piping in *buildings* described in Subsection 3.2.6., they shall have a smoke developed classification of not more than 100.

(6) Exposed piping or equipment subject to human contact shall be insulated so that the temperature of the exposed surface does not exceed 70°C.

(7) No *flame-spread rating* or smoke developed classification limitations are required where *combustible* insulation and coverings are used on piping when such piping is,

(a) located within a concealed space in a wall,

(b) located in a floor slab, or

(c) enclosed in a *noncombustible* raceway or conduit.

6.2.9.3. Clearances

(1) Clearances between *combustible* material and bare pipes carrying steam or hot water shall conform to Table 6.2.9.3.

Table 6.2.9.3.
Clearance Between Steam or Hot Water Pipes and Combustible Material

Forming Part of Sentence 6.2.9.3.(1)

COLUMN 1	COLUMN 2
Steam or Water Temperature, °C	Minimum Clearance, mm
not above 95	no clearance
above 95 to 120	15
above 120	25

6.2.9.4. Surface Temperature

(1) The exposed surface temperature of a steam or hot water radiator shall not exceed 70°C unless precautions are taken to prevent human contact.

6.2.9.5. Protection

(1) Where a pipe carrying steam or hot water at a temperature above 120°C passes through a *combustible* floor, ceiling or wall, the construction shall be protected by a sleeve of metal or other *noncombustible* material not less than 50 mm larger in diameter than the pipe.

(2) Unprotected steam or hot water pipes that pass through a storage space shall be covered with not less than 25 mm of *noncombustible* insulation to prevent direct contact with the material stored.

6.2.9.6. Piping in Shafts

(1) Where piping for heating or *air-conditioning* systems is enclosed in a shaft, the requirements of Article 3.6.3.1. for shafts shall apply.

6.2.10. Refrigerating Systems and Equipment for Air-Conditioning

6.2.10.1. Cooling Units

(1) Where a cooling unit is combined with a fuel-fired *furnace* in the same duct system, the cooling unit shall be installed,

(a) in parallel with the heating *furnace*,

(b) upstream of the *furnace* provided the *furnace* is designed for such application, or

(c) downstream of the *furnace* provided the cooling unit is designed to prevent excessive temperature or pressure in the refrigeration system.

6.2.11. Storage Bins

6.2.11.1. Storage Bins

(1) Service pipes passing through a storage bin for solid fuel shall be protected or so located as to avoid damage to the pipes.

(2) Except for fuel-thawing pipes, every pipe designed to operate at a temperature of 50°C or above shall be located where fuel cannot be stored in contact with it.

(3) A storage bin for solid fuel shall not be located above a sewer opening or drain opening.

(4) Storage bins for solid fuel shall be designed and constructed so that the air temperature in the bin or the surface temperature of any part of the floor or walls is below 50°C.

6.2.11.2. Ash Storage Bins

(1) Every ash storage bin shall be constructed of *noncombustible* material.

(2) Every opening in an ash storage bin shall be protected by a tight-fitting metal door with metal frame securely fastened to the bin.

6.2.12. Carbon Monoxide Alarms

6.2.12.1. Application

(1) This Subsection applies to every *building* that,

(a) contains a *residential occupancy*, and

(b) contains a fuel-burning *appliance* or a *storage garage*.

6.2.12.2. Location of Carbon Monoxide Alarms

(1) Where a fuel-burning *appliance* is installed in a *suite* of *residential occupancy*, a carbon monoxide alarm shall be installed adjacent to each sleeping area in the *suite*.

(2) Where a fuel-burning *appliance* is installed in a *service room* that is not in a *suite* of *residential occupancy*, a carbon monoxide alarm shall be installed,

(a) adjacent to each sleeping area in every *suite* of *residential occupancy* that is adjacent to the *service room*, and

(b) in the *service room*.

(3) Where a *storage garage* is located in a *building* containing a *residential occupancy*, a carbon monoxide alarm shall be installed adjacent to each sleeping area in every *suite* of *residential occupancy* that is adjacent to the *storage garage*.

6.2.12.3. Installation and Conformance to Standards

(1) The carbon monoxide alarms required by Article 6.2.12.2. shall,

(a) be permanently connected to an electrical circuit and shall have no disconnect switch between the overcurrent device and the carbon monoxide alarm,

(b) be wired so that its activation will activate all carbon monoxide alarms within the *suite*, where located within a *suite* of *residential occupancy*,

(c) be equipped with an alarm that is audible within bedrooms when the intervening doors are closed, where located in a *suite* of *residential occupancy*, and

(d) conform to,

  (i) CAN/CSA-6.19, "Residential Carbon Monoxide Alarming Devices", or

  (ii) UL 2034, "Single and Multiple Station Carbon Monoxide Alarms".

Section 6.3. Chimneys and Venting Equipment

6.3.1. General

6.3.1.1. Requirement for Venting

(1) Except as provided in Articles 6.3.1.2. and 6.3.1.3., the products of combustion from solid fuel-burning *appliances* shall be vented in conformance with the requirements in the applicable *appliance* installation standards listed in Article 6.2.1.5.

6.3.1.2. Masonry or Concrete Chimneys

(1) Rectangular *masonry or concrete chimneys* not more than 12 m in height shall conform to Part 9 if they serve,

(a) *appliances* with a combined total rated heat output of 120 kW or less, or

(b) fireplaces.

(2) *Masonry or concrete chimneys* other than those described in Sentence (1) shall be designed and installed in conformance with the appropriate requirements in NFPA 211, "Standard for Chimneys, Fireplaces, Vents and Solid Fuel-Burning Appliances".

6.3.1.3. Metal Smoke Stacks

(1) Single wall metal smoke stacks shall be designed and installed in conformance with NFPA 211, "Standard for Chimneys, Fireplaces, Vents and Solid Fuel-Burning Appliances".

6.3.1.4. Reserved

6.3.1.5. Access Ladders

(1) Access ladders for *chimneys*, when provided, shall consist of steel or bronze rungs, built into the walls of the *chimneys*.

(2) Rungs for external ladders shall begin at not less than 2 500 mm from ground level.

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PLUMBING

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Section 7.1. General

7.1.1. Scope

7.1.1.1. Scope

(1) The scope of this Part shall be as described in Subsection 1.1.2. of Division A.

7.1.2. Application

7.1.2.1. Application

(1) Except as provided in Sentence (2), this Part applies to the design and *construction* of *plumbing*.

(2) This Part does not apply to industrial process systems unless the industrial process system is interconnected with the *plumbing system*, in which case the interconnection shall be so designed and installed so that the *plumbing system* is protected against contamination or malfunction that may be caused by the industrial system.

7.1.3. Definitions

7.1.3.1. Definitions

(1) In this Part,

Storey means the interval between two successive floor levels including *mezzanine* floors that contain *plumbing* or between a floor level and roof.

7.1.4. Plumbing Facilities

7.1.4.1. Facilities Required

(1) *Plumbing* facilities shall be provided in accordance with Subsection 3.7.4. and Section 9.31.

7.1.4.2. Floor Drains

(1) Where gravity drainage to a *sanitary drainage system* is possible, a floor drain shall be installed in a basement forming part of a *dwelling unit*.

(2) Where gravity drainage to a *sanitary drainage system* is not possible, the floor drain required by Sentence (1) may be connected to a *storm drainage system*, dry well or drainage ditch provided it is located where it can receive only *clear water waste* or *storm sewage*.

(3) A floor drain shall be provided in a public laundry room, garbage room, incinerator room, *boiler* or heating room that is not located within a *dwelling unit*.

7.1.5. Service Connections

7.1.5.1. Sanitary Drainage Systems

(1) Every *sanitary drainage system* shall be connected to a public *sanitary sewer*, a public combined sewer or a *private sewage disposal system*.

(2) A combined *building drain* or a combined *building sewer* shall not be installed.

7.1.5.2. Storm Drainage Systems

(1) Every *storm drainage system* shall be connected to a public *storm sewage* works, a public combined *sewage* works or a designated storm water disposal location but shall not be connected to a *sanitary sewage* works.

7.1.5.3. Water Distribution Systems

(1) Except as provided in Sentence (2), every *water distribution system* shall be connected,

(a) to a watermain that is part of a *municipal drinking-water system*, or

(b) to a *drinking-water system*, if a watermain described in Clause (a) is not available.

(2) *Storm sewage* or *greywater* that is free of solids may be used for the flushing of water closets, urinals or the priming of *traps*.

(3) Piping conveying the non-*potable* water described in Sentence (2) shall be installed in conformance with Section 7.7.

7.1.5.4. Separate Services

(1) Piping in any *building* shall be connected to the public services separately from piping of any other *building*, except that an ancillary *building* on the same property may be served by the same service.

(2) No *plumbing* serving a *dwelling unit* shall be installed in or under another unit of the *building* unless the piping is located in a tunnel, pipe corridor, common *basement* or parking garage, so that the piping is *accessible* for servicing and maintenance throughout its length without encroachment on any private living space, but this Sentence does not prevent *plumbing* serving a unit located above another unit from being installed in or under the lower unit.

7.1.5.5. Private Sewers and Private Water Supply

(1) *Private sewers* and *private water supply* pipes shall be installed according to MOE, "Guidelines for the Design of Sanitary Sewage Systems, Guidelines for the Design of Storm Sewer Systems, Guidelines for the Design of Water Distribution Systems and Guidelines for Servicing in Areas Subject to Adverse Conditions".

7.1.6. Location of Fixtures

7.1.6.1. Lighting and Ventilation Requirements

(1) *Plumbing fixtures* shall not be installed in a room that is not lighted and ventilated in accordance with the appropriate requirements in Parts 3 and 9.

7.1.6.2. Accessibility

(1) Every *fixture*, *plumbing appliance*, *interceptor*, *cleanout*, valve, device or piece of equipment shall be so located that it is readily *accessible* for use, cleaning and maintenance.

Section 7.2. Materials and Equipment

7.2.1. General

7.2.1.1. Exposure of Materials

(1) Where unusual conditions exist such as excessively corrosive *soil* or water, only materials suited for use in such locations shall be used.

(2) Materials and equipment used in a *drainage system* where excessively corrosive wastes are present shall be suitable for the purpose.

7.2.1.2. Restrictions on Re-Use

(1) Used materials and equipment, including *fixtures*, shall not be reused unless they meet the requirements of this Part for new materials and equipment and are otherwise satisfactory for their intended use.

(2) Materials and equipment that have been used for a purpose other than the distribution of *potable* water shall not be subsequently used in a *potable water system*.

7.2.1.3. Identification and Certification

(1) Every length of pipe and every fitting shall have cast, stamped or indelibly marked on it the maker's name or mark and the weight or class or quality of the product, or it shall be marked in accordance with the relevant standard, and such markings shall be visible after installation.

(2) Where a component of a *plumbing system* is required by this Code to comply with a standard and the compliance is not certified by a testing agency accredited by the Standards Council of Canada for the testing of the component in question and, when an inspector requests proof of the compliance, proof of compliance shall be produced by the person proposing to install or have installed the component, and without such proof the component shall not be installed as a permanent part of any *plumbing system*.

(3) The lack of certification markings on a product or *plumbing* component shall be regarded as proof, in the absence of evidence to the contrary that no certification exists.

(4) If a component of a *plumbing system* is required to be certified to a standard, the certification shall be made by a testing agency accredited for that purpose by the Standards Council of Canada.

7.2.1.4. Pipe or Piping

(1) Where the term pipe or piping and fittings is used, it shall also apply to tube or tubing and fittings unless otherwise stated.

7.2.1.5. Withstanding Pressure

(1) Piping, fittings and joints used in pressure sewer, forcemain or sump pump discharge applications shall be capable of withstanding at least one and one-half times the maximum potential pressure.

7.2.2. Fixtures

7.2.2.1. Surface Requirements

(1) Except for the area designed to be slip proof in such *fixtures*, every exposed area of a *fixture* shall have a smooth, hard corrosion-resistant surface that is free from flaws and blemishes that may interfere with cleaning.

7.2.2.2. Conformance to Standards

(1) Every water closet and urinal shall conform to the requirements in Article 7.6.4.2.

(2) Every vitreous china fixture shall conform to CAN/CSA-B45.1, "Ceramic Plumbing Fixtures".

(3) Every enamelled cast iron fixture shall conform to CAN/CSA-B45.2, "Enamelled Cast Iron Plumbing Fixtures".

(4) Every porcelain enamelled steel fixture shall conform to CAN/CSA-B45.3, "Porcelain-Enamelled Steel Plumbing Fixtures".

(5) Every stainless steel fixture shall conform to CAN/CSA-B45.4, "Stainless Steel Plumbing Fixtures".

(6) Every plastic fixture shall conform to CAN/CSA-B45.5, "Plastic Plumbing Fixtures".

(7) Every hydromassage bathtub shall conform to CAN/CSA-B45.10, "Hydromassage Bathtubs".

(8) Every macerating toilet system for single bathrooms shall conform to CAN/CSA-B45.9, "Macerating Systems and Related Components".

7.2.2.3. Showers

(1) Every shower receptor shall be constructed and arranged so that water cannot leak through the walls or floor.

(2) Not more than 6 shower heads shall be served by a single shower drain.

(3) Where two or more shower heads are served by a shower drain, the floor shall be sloped and the drain located so that water from one head cannot flow over the area that serves another head.

(4) Except for column showers, when a battery of shower heads is installed, the horizontal distance between two adjacent shower heads shall be at least 750 mm.

7.2.2.4. Concealed Overflows

(1) A dishwashing sink and a food preparation sink shall not have concealed overflows.

7.2.2.5. Water Closets in Public Washrooms

(1) Except for Eastern-Style toilets, where a water closet is installed in a washroom for *public use* it shall be of the elongated type and provided with a seat of the open front type.

7.2.2.6. Lavatories

(1) A lavatory that does not have an overflow shall be equipped with a centre outlet waste fitting.

7.2.2.7. Trough Urinals

(1) No trough urinal shall be used as part of a *plumbing system*.

7.2.3. Traps and Interceptors

7.2.3.1. Traps

(1) Except as provided for in Sentence (2), every *trap* shall,

(a) have a *trap seal depth* of at least 38 mm,

(b) be so designed that failure of the seal walls will cause exterior leakage, and

(c) have a water seal that does not depend on the action of moving parts.

(2) The *trap seal depth* on *fixtures* draining to an acid waste system shall be a minimum of 50 mm.

(3) Every *trap* that serves a lavatory, a sink or a laundry tray shall,

(a) be provided with a *cleanout* plug of a minimum ¾ in. *size* located at the lowest point of the *trap* and of the same material as the *trap*, except that a cast iron *trap* shall be provided with a brass *cleanout* plug, or

(b) be designed so that part of the *trap* can be removed for cleaning purposes.

(4) A bell *trap* or an S-*trap* shall not be installed in a *drainage system*.

(5) A *drum trap* shall not be installed in a *drainage system*.

(6) Except as permitted in Sentence (7), no *bottle trap* shall be used in a *plumbing system*.

(7) A *bottle trap* may be used on a laboratory sink or other *fixture* equipped with corrosion resistant fittings.

(8) No running *trap* shall be installed in a *plumbing system* unless an *accessible* handhole is provided for cleaning of the *trap*, and where the *trap* is too small to accommodate a handhole, a *cleanout* shall be provided.

7.2.3.2. Interceptors

(1) Every *interceptor* shall be designed so that it can be readily cleaned.

(2) Every grease *interceptor* shall be designed so that it does not become air bound.

7.2.3.3. Tubular Traps

(1) Tubular metal or plastic *traps* that conform to CAN/CSA-B125, "Plumbing Fittings" shall be used in *accessible* locations.

7.2.4. Pipe Fittings

7.2.4.1. T and Cross Fittings

(1) A T fitting shall not be used in a *drainage system* except to connect a *vent pipe*.

(2) A cross fitting shall not be used in a *drainage system*.

7.2.4.2. Sanitary T Fittings

(1) A double sanitary T fitting shall not be used to connect the *fixture drains* of two urinals where no *cleanout* fitting is provided above the connection.

(2) No pipe fitting, joint or connection that would tend to intercept solids or reduce the flow through a pipe by more than 10 percent shall be used in a *plumbing system*.

7.2.4.3. 90° Elbows

(1) Except as permitted in Sentences (2) and (3), 90° elbows of 4 in. *size* or less that have a centre-line radius that is less than the *size* of the pipe shall not be used to join two *soil* or *waste pipes*.

(2) 90° elbows of 4 in. *size* or less in *sanitary drainage systems* may be used,

(a) to change the direction of piping from horizontal to vertical, in the direction of flow,

(b) where a *trap arm* enters a wall, or

(c) to connect *trap arms* as permitted by Sentence 7.5.6.3.(2).

(3) A 90° elbow that is part of the pre-engineered wastewater heat recovery system is permitted to have a centre-line radius that is less than the *size* of the pipe.

7.2.4.4. Fittings Restricted in Use

(1) No double Y, double TY, double T or double waste fitting shall be installed in a *nominally horizontal soil* or *waste pipe*.

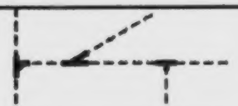
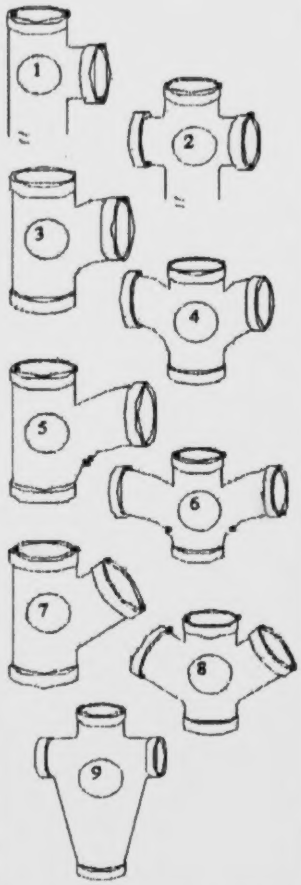
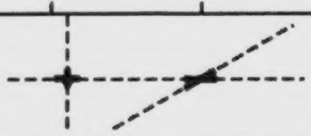
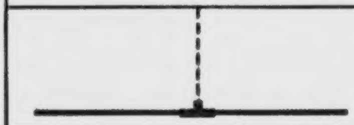
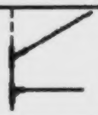
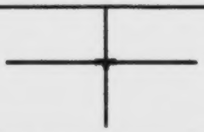
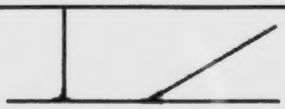
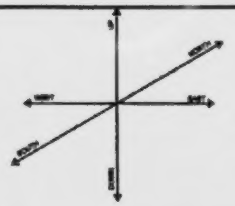
7.2.4.5. Assembled Pipe or Tubing

(1) Pipe or tubing assembled to comprise a standard drain waste and venting system shall be connected with drain, waste and vent fittings in conformance with Table 7.2.4.5.

Table 7.2.4.5.

Pipe Arrangement for DWV Fittings

Forming Part of Sentence 7.2.4.5.(1)

Pipe Arrangement	Fittings	
	Acceptable	Type
	①③⑤⑦	
	②④⑥⑧⑨	
	①③⑤⑦	
	③⑤⑦	
	④*⑥⑧⑨*	
	⑤⑦	
	LEGEND (DWV BRANCH FITTINGS) Vent pipe ------------------------ Drainage pipe ________________ * Acceptable only if vertical run is of 3 inches size or larger and horizontal branches are of 1 ¼, 1 ½, or 2 inches size	

1. Straight T
2. Double T or Cross
3. Sanitary T or Short Turn TY
4. Double Sanitary T or Short Turn Double TY
5. Combination Y & 1/8 Bend or Long Turn TY
6. Double Combination Y & 1/8 Bend or Double Long Turn TY
7. Y
8. Double Y
9. Double Waste Fitting

7.2.5. Non-Metallic Pipe and Fittings

7.2.5.1. Asbestos-Cement Drainage Pipe and Fittings

(1) Except as provided in Sentence (2), asbestos-cement pipe and its fittings for use in a drain, waste or vent system shall conform to,

(a) CAN/CGSB-34.22, "Asbestos-Cement Drain Pipe", or

(b) CSA B127.1, "Asbestos Cement Drain, Waste and Vent Fittings".

(2) Asbestos-cement pipe and fittings used underground either outside a *building* or under a *building* shall conform to Sentence (1) or to,

(a) CAN/CGSB-34.9, "Asbestos-Cement Sewer Pipe",

(b) CAN/CGSB-34.23, "Asbestos-Cement House Connection Sewer Pipe", or

(c) CSA B127.2, "Components for Use in Asbestos-Cement Building Sewer Systems".

7.2.5.2. Reserved

7.2.5.3. Concrete Pipe and Fittings

(1) Concrete pipe shall conform to CSA A257 Series, "Standards for Circular Concrete Pipe and Manholes".

(2) Joints with external elastomeric gaskets shall be made with corrosion resistant external band type flexible mechanical couplings that conform to CAN/CSA-B602, "Mechanical Couplings for Drain, Waste, and Vent Pipe and Sewer Pipe".

(3) Concrete fittings field fabricated from lengths of pipe shall not be used.

(4) Concrete pipe shall not be used above ground inside a *building*.

(5) Precast reinforced circular concrete manhole sections, catch basins and fittings shall conform to CSA A257.4, "Precast Reinforced Circular Concrete Manhole Sections, Catch Basins, and Fittings".

7.2.5.4. Vitrified Clay Pipe and Fittings

(1) Vitrified clay pipe and fittings shall be certified to CSA A60.1-M, "Vitrified Clay Pipe".

(2) Couplings and joints for vitrified clay pipe shall be certified to CSA A60.3-M, "Vitrified Clay Pipe Joints".

(3) Vitrified clay pipe and fittings shall not be used except for an underground part of a *drainage system*.

7.2.5.5. Polyethylene Pipe and Fittings

(1) Polyethylene water pipe, tubing and fittings shall be certified to Series 160 of CAN/CSA-B137.1, "Polyethylene Pipe, Tubing and Fittings for Cold Water Pressure Services".

(2) Except as permitted in Sentence 7.2.5.7.(1), polyethylene water pipe shall not be used except for a *water service pipe*.

(3) Butt fusion fittings for polyethylene pipe shall conform to ASTM D3261, "Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing".

7.2.5.6. Polyethylene Pipe Used Underground

(1) Polyethylene pipe used underground in a *drainage system* for rehabilitation of existing systems using trenchless technology shall conform to ASTM F714, "Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter" and shall be HDPE 3408, SDR 17 or heavier.

7.2.5.7. Crosslinked Polyethylene Pipe and Fittings

(1) Cross-linked polyethylene pipe and its associated fittings used in hot and cold *potable water systems* shall be certified to CAN/CSA-B137.5, "Cross-linked Polyethylene (PEX) Tubing Systems for Pressure Applications".

7.2.5.8. PVC Pipe and Fittings

(1) PVC water pipe, fittings and solvent cement shall be certified to CAN/CSA-B137.3, "Rigid Polyvinyl Chloride (PVC) Pipe for Pressure Applications" or CAN/CSA-B137.2, "PVC Injection-Moulded Gasketed Fittings for Pressure Applications", and have a minimum pressure rating of 1 100 kPa.

(2) PVC water pipe and fittings in Sentence (1) shall not be used in a hot *water system*.

7.2.5.9. CPVC Pipe, Fittings and Solvent Cements

(1) CPVC hot and cold water pipe, fittings and solvent cements shall be certified to CSA B137.6, "CPVC Pipe, Tubing and Fittings for Hot and Cold Water Distribution Systems".

(2) The design temperature and design pressure of a CPVC piping system shall conform to CSA B137.6, "CPVC Pipe, Tubing and Fittings for Hot and Cold Water Distribution Systems".

7.2.5.10. Plastic Pipe, Fittings and Solvent Cement Used Underground

(1) Plastic pipe, fittings and solvent cement used underground outside a *building* or under a *building* in a *drainage system* shall be certified to,

(a) ASTM F628, "Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 Plastic Drain, Waste and Vent Pipe With a Cellular Core",

(b) CAN/CSA-B181.1, "ABS Drain, Waste, and Vent Pipe and Pipe Fittings",

(c) CAN/CSA-B181.2, "PVC Drain, Waste, and Vent Pipe and Pipe Fittings",

(d) CAN/CSA-B182.1, "Plastic Drain and Sewer Pipe and Pipe Fittings",

(e) CAN/CSA-B182.2, "PVC Sewer Pipe and Fittings, (PSM Type)",

(f) CAN/CSA-B182.4, "Profile (Ribbed) PVC Sewer Pipe and Fittings",

(g) CAN/CSA-B182.6, "Profile Polyethylene Sewer Pipe and Fittings",

(h) CAN/CSA B182.7, "Multilayer PVC Sewer Pipe (PSM Type) Having Reprocessed-Recycled Content",

(i) CAN/CSA-B137.2, "PVC Injection-Moulded Gasketed Fittings for Pressure Applications", or

(j) CAN/CSA-B137.3, "Rigid Polyvinyl Chloride (PVC) Pipe for Pressure Applications",

(2) Except as permitted in Clauses (i) and (j), plastic pipe used as described in Sentence (1) shall have a stiffness equal or greater than 320 kPa.

7.2.5.11. Transition Solvent Cement

(1) Solvent cement for transition joints shall conform to,

(a) CAN/CSA-B181.1, "ABS Drain, Waste and Vent Pipe and Pipe Fittings", or

(b) CAN/CSA-B181.2, "PVC Drain, Waste and Vent Pipe and Pipe Fittings".

(2) Transition solvent cement shall only be used for joining an ABS *plumbing system* to a PVC *plumbing system*.

7.2.5.12. Plastic Pipe, Fittings and Solvent Cement Used in Buildings

(1) Plastic pipe, fittings and solvent cement used inside or under a *building* in a *sanitary drainage system* or *venting system* shall be certified to,

(a) ASTM F628, "Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 Plastic Drain, Waste, and Vent Pipe With a Cellular Core",

(b) CAN/CSA-B181.1, "ABS Drain, Waste, and Vent Pipe and Pipe Fittings", or

(c) CAN/CSA-B181.2, "PVC Drain, Waste, and Vent Pipe and Pipe Fittings".

(2) Plastic pipe, fittings and solvent cement used inside a *building* in a *storm drainage system* shall be certified to,

(a) ASTM F628, "Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 Plastic Drain, Waste, and Vent Pipe With a Cellular Core",

(b) CAN/CSA-B181.1, "ABS Drain, Waste, and Vent Pipe and Pipe Fittings",

(c) CAN/CSA-B181.2, "PVC Drain, Waste, and Vent Pipe and Pipe Fittings",

(d) CAN/CSA-B182.1, "Plastic Drain and Sewer Pipe and Pipe Fittings", or

(e) CAN/CSA-B182.2, "PVC Sewer Pipe and Fittings, (PSM Type)".

(3) Plastic pipe used as described in Sentence (2) shall have a pipe stiffness equal or greater than 320 kPa.

(4) Requirements for *combustible* piping in relation to fire safety shall conform to Sentences 3.1.5.16.(1) and 9.10.9.6.(2) to (8) and Articles 3.1.9.4. and 9.10.9.7.

(5) Where *noncombustible* piping pierces a *fire separation* or a fire stop, the requirements for fire stopping of Subsection 3.1.9., Sentence 9.10.9.6.(1) and Article 9.10.16.4. shall apply.

7.2.5.13. Polyethylene/Aluminum/Polyethylene Composite Pipe and Fittings

(1) PE/AL/PE composite pipe and fittings used for *potable water systems* shall conform to CAN/CSA-B137.9, "Polyethylene/Aluminum/ Polyethylene Composite Pressure Pipe Systems".

(2) PE/AL/PE pipe and fittings shall not be used in a hot *water system*.

7.2.5.14. Crosslinked Polyethylene/ Aluminum/ Polyethylene Composite Pipe and Fittings

(1) PEX/AL/PEX composite pipe and fittings used for *potable water systems* shall conform to CAN/CSA-B137.10, "Crosslinked Polyethylene/Aluminum/Crosslinked Polyethylene Composite Pressure Pipe Systems".

7.2.5.15. Polypropylene Pipe and Fittings

(1) Polypropylene pipe and fittings used for hot and cold *potable water systems* shall conform to CAN/CSA-B137.11, "Polypropylene (PP-R) Pipe and Fittings for Pressure Applications".

7.2.6. Ferrous Pipe and Fittings

7.2.6.1. Cast Iron Drainage and Vent Pipe and Fittings

(1) Drainage piping, vent piping and fittings made of cast iron shall be certified to CAN/CSA-B70, "Cast Iron Soil Pipe, Fittings and Means of Joining".

(2) Cast iron *soil pipe* and fittings shall not be used in a *water system*.

7.2.6.2. Cast Iron Fittings for Asbestos-Cement Drainage Pipe

(1) Cast iron fittings designed for use with asbestos-cement pipe for drainage purposes shall conform to the applicable requirements of,

(a) CSA B127.1, "Asbestos Cement Drain, Waste and Vent Fittings", or

(b) CSA B127.2-M, "Components for Use in Asbestos Cement Building Sewer Systems".

7.2.6.3. Threaded Cast Iron Drainage Fittings

(1) Threaded cast iron drainage fittings shall conform to ANSI/ASME B16.12, "Cast-Iron Threaded Drainage Fittings".

(2) Threaded cast iron drainage fittings shall not be used in a *water system*.

7.2.6.4. Cast Iron Water Pipe

(1) Cast iron water pipes shall conform to ANSI/AWWA C151/A21.51, "Ductile-Iron Pipe, Centrifugally Cast for Water".

(2) Cement mortar lining for cast iron water pipes shall conform to ANSI/AWWA C104/A21.4, "Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water".

(3) Iron fittings for cast iron or ductile-iron water pipes shall conform to ANSI/AWWA C110/A21.10, "Ductile-Iron and Gray-Iron Fittings, 3-in. Through 48-in., (75 mm Through 1200 mm) for Water and Other Liquids".

(4) Rubber gasket joints for cast iron and ductileiron pressure pipe for water piping shall conform to ANSI/AWWA C111/A21.11, "Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings".

7.2.6.5. Screwed Cast Iron Water Fittings

(1) Screwed cast iron water fittings shall conform to ANSI/ASME B16.4, "Gray Iron Threaded Fittings".

(2) Screwed cast iron water fittings used in a *water system* shall be cement-mortar lined or galvanized.

(3) Screwed cast iron water fittings shall not be used in a *drainage system*.

7.2.6.6. Screwed Malleable Iron Water Fittings

(1) Screwed malleable iron water fittings shall conform to ANSI/ASME B16.3, "Malleable Iron Threaded Fittings".

(2) Screwed malleable iron water fittings used in a *water system* shall be cement-mortar lined or galvanized.

(3) Screwed malleable iron water fittings shall not be used in a *drainage system*.

7.2.6.7. Steel Pipe

(1) Except as provided in Sentences (2) and (3), welded and seamless steel pipe shall not be used in a *plumbing system*.

(2) Galvanized steel pipe may be used in a *drainage system* or a *venting system* above ground inside a *building*.

(3) Galvanized steel pipe and fittings shall not be used in a *water distribution system* except,

(a) in buildings of industrial occupancy, or

(b) for the repair of existing galvanized steel piping systems.

(4) Galvanized steel pipe and fittings shall conform to ASTM A53/A53M, "Pipe, Steel, Black and Hot Dipped, Zinc-Coated Welded and Seamless".

(5) Where galvanized steel pipe is used in a *drainage system*, it shall be used with drainage fittings.

(6) All steel pipe of 4 in. *size* and smaller shall be schedule 40 or heavier and fittings of less than 2 in. *size* shall be galvanized screw fittings.

7.2.6.8. Corrugated Steel Pipe and Couplings

(1) Corrugated steel pipe and couplings shall be certified to CSA G401, "Corrugated Steel Pipe Products".

(2) Corrugated steel pipe shall only be used underground outside a *building* in a *storm drainage system*.

(3) Couplings for corrugated steel pipe shall be constructed so that when installed they shall,

(a) maintain the pipe alignment,

(b) resist the separation of adjoining lengths of pipe,

(c) prevent root penetration, and

(d) prevent the infiltration of surrounding material.

7.2.6.9. Sheet Metal Leaders

(1) A sheet metal *leader* shall not be used except above ground outside a *building*.

7.2.7. Non-Ferrous Pipe and Fittings

7.2.7.1. Copper and Brass Pipe

(1) Copper pipe shall conform to ASTM B42, "Seamless Copper Pipe, Standard Sizes".

(2) Brass pipe shall conform to ASTM B43, "Seamless Red Brass Pipe, Standard Sizes".

7.2.7.2. Brass or Bronze Pipe Flanges and Flanged Fittings

(1) Brass or bronze pipe flanges and flanged fittings shall conform to ANSI/ASME B16.24, "Cast Copper Alloy Pipe Flanges and Flanged Fittings".

7.2.7.3. Brass or Bronze Threaded Water Fittings

(1) Brass or bronze threaded water fittings shall conform to ANSI/ASME B16.15, "Cast Bronze Threaded Fittings, Classes 125 and 250".

(2) Brass or bronze threaded water fittings shall not be used in a *drainage system*.

7.2.7.4. Copper Tube

(1) Copper tube in a *plumbing system* shall,

(a) be certified to ASTM B88, "Seamless Copper Water Tube", or

(b) comply with ASTM B306, "Copper Drainage Tube (DWV)".

(2) The use of copper tube shall conform to Table 7.2.7.4.

(3) Copper tube used in a *plumbing appliance* shall conform to,

(a) ASTM B88, "Seamless Copper Water Tube", or

(b) ASTM B68, "Seamless Copper Tube".

(4) Type K or L copper tube shall be used for the *potable* water side of a heat exchanger in a pre-engineered wastewater heat recovery system.

Table 7.2.7.4.
Permitted Use of Copper Tube and Pipe

Forming Part of Sentence 7.2.7.4.(2)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8
Type of Copper Tube or *Pipe*	*Water Distribution System*		*Building Sewer*	*Drainage System*		*Venting System*	
	Under ground	Above ground		Under ground	Above ground	Under ground	Above ground
K & L hard	N	P	P	P	P	P	P
K & L soft	P	P	N	N	N	N	N
M hard	N	P	N	N	P	N	P
M soft	N	N	N	N	N	N	N
DWV	N	N	N	N	P	N	P

Notes to Table 7.2.7.4.:

P – Permitted

NP – Not Permitted

7.2.7.5. Solder-Joint Drainage Fittings

(1) Solder-joint fittings for *drainage systems* shall conform to,

(a) ASME B16.23, "Cast Copper Alloy Solder Joint Drainage Fittings: DWV", or

(b) ANSI/ASME B16.29, "Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings – DWV".

(2) Solder-joint fittings for *drainage systems* shall not be used in a *water system*.

7.2.7.6. Solder-Joint Water Fittings

(1) Except as provided in Sentence (2), solder-joint fittings for *water systems* shall conform to,

(a) ANSI B16.18, "Cast Copper Alloy Solder Joint Pressure Fittings", or

(b) ANSI/ASME B16.22, "Wrought Copper and Copper Alloy Solder Joint Pressure Fittings".

(2) Solder-joint fittings for *water systems* not made by casting or the wrought process shall conform to the applicable requirements of ANSI B16.18, "Cast Copper Alloy Solder Joint Pressure Fittings".

7.2.7.7. Flared-Joint Fittings for Copper Water Systems

(1) Flared-joint fittings for copper tube *water systems* shall conform to ANSI/ASME B16.26, "Cast Copper Alloy Fittings for Flared Copper Tubes".

(2) Flared-joint fittings for copper tube *water systems* not made by casting shall conform to the applicable requirements of ANSI/ASME B16.26, "Cast Copper Alloy Fittings for Flared Copper Tubes".

7.2.7.8. Lead Waste Pipe and Fittings

(1) Lead *waste pipe* and fittings shall not be used in a *water system* or for a *building sewer*.

(2) When there is a change in *size* of a lead closet bend, the change shall be in the vertical section of the bend or made in such a manner that there shall be no retention of liquid in the bend.

7.2.8. Corrosion Resistant Materials

7.2.8.1. Pipe and Fittings

(1) Pipes and fittings to be used for drainage and venting of acid and corrosive wastes shall conform to,

(a) ASTM A518/518M, "Corrosion-Resistant High-Silicon Iron Castings",

(b) ASTM C1053, "Boronsilicate Glass Pipe and Fittings for Drain, Waste, and Vent (DWV) Applications", or

(c) CAN/CSA-B181.3, "Polyolefin Laboratory Drainage Systems".

7.2.9. Jointing Materials

7.2.9.1. Cement Mortar

(1) Cement mortar shall not be used for jointing.

7.2.9.2. Solder and Fluxes

(1) Solders for solder joint fittings shall conform to ASTM B32, "Solder Metal" in accordance with the recommended use.

(2) Solders and fluxes having a lead content in excess of 0.2 per cent shall not be used in a *potable water system*.

(3) Fluxes for soldered joints shall conform to ASTM B813, "Liquid and Paste Fluxes for Soldering Applications of Copper and Copper Alloy and Tube".

(4) Joints in all copper tube installed underground outside a *building* or underground inside the *building* shall be made with either flared or corporation fittings, or brazed using a brazing alloy from the American Welding Society AWS-BCuP range.

7.2.10. Miscellaneous Materials

7.2.10.1. Brass Floor Flanges

(1) Brass floor flanges shall be certified to CSA B158.1, "Cast Brass Solder Joint Drainage, Waste and Vent Fittings".

(2) ABS floor flanges shall be certified to CAN/CSA-B181.1, "ABS Drain, Waste, and Vent Pipe and Pipe Fittings".

(3) PVC floor flanges shall be certified to CAN/CSA-B181.2, "PVC Drain, Waste, and Vent Pipe and Pipe Fittings".

(4) Cast iron, copper and aluminum floor flanges shall be suitable for the purpose.

7.2.10.2. Screws, Bolts, Nuts and Washers

(1) Every screw, bolt, nut and washer shall be of materials that are resistant to corrosion, when used,

(a) to connect a water closet to a water closet flange,

(b) to anchor the water closet flange to the floor,

(c) to anchor the water closet to the floor, or

(d) to hold *cleanout* covers or floor drain grates.

7.2.10.3. Cleanout Fittings

(1) Every plug, cap, nut or bolt that is intended to be removable from a ferrous fitting shall be of a non-ferrous material.

(2) A *cleanout* fitting that as a result of normal maintenance operations cannot withstand the physical stresses of removal and reinstallation or cannot ensure a gas-tight seal shall not be installed.

(3) A screw cap or test cap shall not be used as a *cleanout* plug or cover.

7.2.10.4. Mechanical Couplings

(1) Groove and shoulder type mechanical pipe couplings shall conform to CSA B242-M, "Groove and Shoulder Type Mechanical Pipe Couplings".

(2) Mechanical Couplings for DWV and Sewer Pipe shall be certified to CAN/CSA-B602, "Mechanical Couplings for Drain, Waste, and Vent Pipe and Sewer Pipe".

7.2.10.5. Saddle Hubs

(1) Except as provided in Sentence (2), a saddle hub or fitting shall not be installed in *drainage systems*, *venting systems* or *water systems*.

(2) A saddle hub or saddle clamp may be installed in a *building drain* or *building sewer* of nominal diameter not less than eight inches and that is in service provided that the connecting *branch* is at least two pipe *sizes* smaller than the run of the *building drain* or *building sewer* to which it is connected.

7.2.10.6. Supply and Waste Fittings

(1) Supply and waste fittings shall be certified to CAN/CSA-B125, "Plumbing Fittings".

7.2.10.7. Reserved

7.2.10.8. Direct Flush Valves

(1) Every direct flush valve shall,

(a) open fully and close positively under service pressure,

(b) complete its cycle of operation automatically,

(c) be provided with a means of regulating the volume of water that it discharges, and

(d) be provided with a *vacuum breaker* unless the *fixture* is designed so that *back-siphonage* cannot occur.

7.2.10.9. Drinking Fountain Bubblers

(1) The orifice of every drinking fountain bubbler shall,

(a) be of the shielded type, and

(b) direct the water upward to an angle of approximately 45°.

(2) Every drinking fountain bubbler shall include a means of regulating the flow to the orifice.

7.2.10.10. Back-Siphonage Preventers and Backflow Preventers

(1) Except as provided in Sentence (2) *back-siphonage preventers* and *backflow preventers* shall be certified to,

(a) CAN/CSA-B64.0, "Definitions, General Requirements and Test Methods for Vacuum Breakers and Backflow Preventers",

(b) CAN/CSA-B64.1.1, "Vacuum Breakers, Atmospheric Type (AVB)",

(c) CAN/CSA-B64.1.2, "Vacuum Breakers, Pressure Type (PVB)",

(d) CAN/CSA-B64.2, "Vacuum Breakers, Hose Connection Type (HCVB)",

(e) CAN/CSA-B64.2.1, "Vacuum Breakers, Hose Connection Type (HCVB) with Manual Draining Feature,"

(f) CAN/CSA-B64.2.2, "Vacuum Breakers, Hose Connection type (HCVB) with Automatic Draining Feature,"

(g) CAN/CSA-B64.3, "Backflow Preventers, Dual Check Valve with Atmospheric Port Type (DCAP)",

(h) CAN/CSA-B64.4, "Backflow Preventers, Reduced Pressure Principle Type (RP)",

(i) CAN/CSA-B64.5, "Backflow Preventers, Double Check Valve Type (DCVA)",

(j) CAN/CSA-B64.6, "Backflow Preventers, Dual Check Valve Type (DuC)",

(k) CAN/CSA-B64.7, "Vacuum Breakers, Laboratory Faucet Type (LFVP)",

(l) CAN/CSA-B64.8, "Backflow Preventers, Dual Check with Intermediate Vent Type (DuCV)", or

(m) CAN/CSA-B64.10, "Manual for the Selection and Installation of Backflow Prevention Devices".

(2) *Back-siphonage preventers* for tank type water closets shall be certified to CAN/CSA-B125, "Plumbing Fittings".

7.2.10.11. Relief Valves

(1) Temperature relief, pressure relief, combined temperature and pressure relief and vacuum relief valves shall conform to ANSI Z21.22 / CSA 4.4-M, "Relief Valves for Hot Water Supply Systems".

7.2.10.12. Reducing Valves

(1) Direct acting water pressure reducing valves for domestic water supply systems shall conform to CAN/CSA-B356, "Water Pressure Reducing Valves for Domestic Water Supply Systems".

7.2.10.13. Solar Domestic Hot Water

(1) Equipment forming part of a packaged system for solar heating of *potable* water, shall conform to CAN/CSA-F379.1, "Solar Domestic Hot Water Systems (Liquid to Liquid Heat Transfer)".

7.2.10.14. Vent Pipe Flashing

(1) Flashing fabricated on-site for *vent pipes* shall be fabricated from,

(a) copper sheet at least 0.33 mm thick,

(b) aluminum sheet at least 0.61 mm thick,

(c) alloyed zinc sheet at least 0.35 mm thick,

(d) lead sheet at least 2.16 mm thick,

(e) galvanized steel sheet at least 0.41 mm thick, or

(f) polychloroprene (neoprene) at least 2.89 mm thick.

(2) Prefabricated flashing for *vent pipes* shall be certified to CSA B272, "Prefabricated Self-Sealing Vent Flashings".

7.2.10.15. Water Hammer Arresters

(1) Factory built water hammer arresters shall conform to ASSE 1010, "Water Hammer Arresters".

7.2.10.16. Air Admittance Valves

(1) Air admittance valves shall conform to ASSE 1051, "Individual and Branch Type Air Admittance Valves for Sanitary Drainage Systems".

7.2.11. Water Service Pipes and Fire Service Mains

7.2.11.1. Design, Construction, Installation and Testing

(1) Except as provided in Articles 7.2.11.2. to 7.2.11.4., and 7.3.7.2, the design, construction, installation and testing of *fire service mains* and *water service pipe* combined with *fire service mains* shall be in conformance with NFPA 24, "Installation of Private Fire Service Mains and Their Appurtenances".

7.2.11.2. Certification or Conformance

(1) *Water service pipes* and *fire service mains* shall be certified or conform to the standards for the materials listed in Table 7.2.11.2.

Table 7.2.11.2.
Water Service Pipe and Fire Service Main Materials

Forming Part of Sentence 7.2.11.2.(1)

COLUMN 1	COLUMN 2	COLUMN 3
Material	Standard	Limitations
Polyethylene pipe and fittings	Certified to Series 160 of CAN/CSA-B137.1, "Polyethylene Pipe, Tubing and Fittings for Cold Water Pressure Services"	
Cross-linked polyethylene pressure pipe or tube and fittings	Certified to CAN/CSA-B137.5, "Cross-linked Polyethylene (PEX) Tubing Systems for Pressure Applications"	
PVC pipe and fittings	Certified to CAN/CSA-B137.3, "Rigid Polyvinyl Chloride (PVC) Pipe for Pressure Applications", or certified to CAN/CSA-B137.2, "PVC Injection-Moulded Gasketed Fittings for Pressure Applications"	Pipe and fittings must have a rated working pressure of 1 100 kPa or more

COLUMN 1	COLUMN 2	COLUMN 3
Material	Standard	Limitations
CPVC pipe and fittings	Certified to CAN/CSA-B137.6, "CPVC Pipe, Tubing and Fittings for Hot and Cold Water Distribution Systems"	The design temperature and pressure shall conform to the requirements of the CSA B137.6, "CPVC Pipe, Tubing and Fittings for Hot and Cold Water Distribution Systems"
Polybutylene pipe and fittings	Certified to CAN/CSA-B137.7, "Polybutylene (PB) Piping for Cold Water Distribution Systems"	Pipe must have an SDR of 11 or less
Cast iron water pipe	Conform to ANSI/AWWA C151/A21.51, "Ductile-Iron Pipe, Centrifugally Cast for Water"	Pipe shall have a cement mortar lining conforming to ANSI/AWWA C104/A21.4, "Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water"
Iron fittings for cast iron or ductile-iron water pipes	Conform to ANSI/AWWA C110/A21.10, "Ductile-Iron and Gray-Iron Fittings, 3-in. Through 48 in. (75 mm Through 1200 mm), for Water and Other Liquids"	Pipe shall have a cement mortar lining conforming to ANSI/AWWA C104/A21.4, "Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water"
Rubber gasket joints for cast iron and ductile-iron water pipes	Conform to ANSI/AWWA C111/A21.11, "Rubber Gasket Joints for Ductile-Iron Pressure Pipe and Fittings"	
Screwed cast iron water fittings	Conform to ANSI/ASME B16.4, "Cast Iron Threaded Fittings)"	Screwed cast iron water fittings shall be cement-mortar lined or galvanized
Type K soft copper tube	Certified to ASTM B88, "Seamless Copper Water Tube"	
Solder-joint fittings for copper water systems	Conform to ANSI B16.18, "Cast Copper Alloy Solder Joint Pressure Fittings", or conform to ANSI/ASME B16.22, "Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings"	Solder-joint fittings not made by casting or the wrought process shall conform to the applicable requirements of ANSI B16.18, "Cast Copper Alloy Solder-Joint Pressure Fittings"
Flared-joint fittings for copper water systems	Conform to ANSI/ASME B16.26, "Cast Copper Alloy Fittings for Flared Copper Tubes"	Flared-joint fittings not made by casting shall conform to ANSI/ASME B16.26, "Cast Copper Alloy Fittings for Flared Copper Tubes"
PE/AL/PE pipe and fittings	Certified to CAN/CSA B137.9, "Polyethylene/Aluminum/ Polyethylene Composite Pressure Pipe Systems"	
PEX/AL/PEX pipe and fittings	Certified to CAN/CSA B137.10, "Crosslinked Polyethylene/ Aluminum/Crosslinked Polyethylene Composite Pressure Pipe Systems"	

7.2.11.3. Tracer Wire

(1) Except as provided in Sentence (2), a 14 gauge TW solid copper light coloured plastic coated tracer wire shall be attached to every non-metallic *water service pipe* or *fire service main*.

(2) Where a *water service pipe* or *fire service main* is detectable without the tracer wire referenced in Sentence (1), the tracer wire may be omitted.

7.2.11.4. Required Check Valve

(1) Where a *water service pipe* is supplied with water by more than one *drinking-water system*, a *check valve* shall be installed at each connection with a *drinking-water system*.

(2) Where a *fire service main* is supplied with water by more than one source, a *check valve* shall be installed at each connection with a source of water.

Section 7.3. Piping

7.3.1. Application

7.3.1.1. Application

(1) This Section applies to the *construction* and use of joints and connections, and the arrangement, protection, support and testing of piping.

7.3.2. Construction and Use of Joints

7.3.2.1. Caulked Lead Drainage Joints

(1) Every caulked lead drainage joint shall be firmly packed with oakum and tightly caulked with lead to a depth of at least 25 mm.

(2) No paint, varnish or other coating shall be applied on the lead until after the joint has been tested.

(3) Caulked lead drainage joints shall not be used except for cast iron pipe in a *drainage system* or *venting system*, or between such pipe and,

(a) other ferrous pipe,

(b) brass and copper pipe,

(c) a caulking ferrule, or

(d) a *trap standard*.

(4) A length of hub and spigot pipe and pipe fittings in a *drainage system* shall be installed with the hub at the upstream end.

7.3.2.2. Wiped Joints

(1) Wiped joints shall not be used except for sheet lead or lead pipe, or between such pipe and copper pipe or a ferrule.

(2) Every wiped joint in straight pipe shall,

(a) be made of solder,

(b) have an exposed surface on each side of the joint at least 19 mm wide, and

(c) be at least 10 mm thick at the thickest part.

(3) Every wiped flanged joint shall be reinforced with a lead flange that is at least 19 mm wide.

7.3.2.3. Screwed Joints

(1) In making a screwed joint the ends of the pipe shall be reamed or filed out to the *size* of the bore and all chips and cuttings shall be removed.

(2) No pipe-joint cement or paint shall be applied to the internal threads.

7.3.2.4. Solder Joints

(1) Soldered joints shall be made in accordance with ASTM B828, "Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings".

7.3.2.5. Flared Joints

(1) In making a flared joint the pipe shall be expanded with a proper flaring tool.

(2) Flared joints shall not be used for hard (drawn) copper tube.

7.3.2.6. Mechanical Joints

(1) Mechanical joints shall be made with compounded elastomeric couplings or rings held by stainless steel or cast iron clamps or contained within a compression connection or groove and shoulder type mechanical coupling.

7.3.2.7. Cold-Caulked Joints

(1) Cold-caulked joints shall not be used except for bell and spigot pipe in a *water system*, a *drainage system* or a *venting system*.

(2) The caulking compound used in cold-caulked joints shall be applied according to the manufacturer's directions.

(3) Every cold-caulked joint in a *drainage system* shall be firmly packed with oakum and tightly caulked with cold caulking compound to a depth of at least 25 mm.

7.3.3. Joints and Connections

7.3.3.1. Drilled and Tapped Joints

(1) Except as provided in Sentences (2) to (4), no water *distributing pipe*, drainage pipe or fittings shall be drilled, tapped or swaged.

(2) A water *distributing pipe* may be drilled or tapped to provide for a mechanically extracted T in copper tubing of Type L or K provided that all branch connections shall be notched and dimpled to limit depth of insertion and conform to the inner contour of the main.

(3) A copper water *distributing pipe* of 1 in. *size* or larger may be mechanically swaged to permit the joining of other copper pipe of equal *size*.

(4) A drainage pipe or fitting may be drilled or tapped,

(a) to provide for the connection of a *trap* seal primer line,

(b) to connect a device designed to dispense germicidal or odour control chemicals or *trap* seal water to a floor drain downstream of a *vacuum breaker* or flush valve in a flush tube connected to a *sanitary unit*,

(c) to provide a hole for a *branch* connection to a drainage pipe, where the *branch* connection is made with a saddle hub as permitted by Article 7.2.10.5. and where the hole is drilled to provide a smooth clean hole of the required *size* and orientation, or

(d) to provide for the connection of pipe or fittings to metal or rigid plastic pipe and fittings where the pipe or fittings are thick enough to be threaded or are bossed for tapping.

(5) No pipe adaption shall be made by the use of a bushing that leaves a square edge or shoulder on the inside of the pipe or fitting.

7.3.3.2. Reserved

7.3.3.3. Prohibition of Welding of Pipes and Fittings

(1) Cast iron *soil pipe* and fittings shall not be welded.

(2) Galvanized steel pipe and fittings shall not be welded.

7.3.3.4. Unions and Slip Joints

(1) Running thread and packing nut connections and unions with a gasket seal shall not be used downstream of a *trap weir* in a *drainage system* or in a *venting system*.

(2) A slip joint shall not be used,

(a) in a *venting system*, or

(b) in a *drainage system*, except to connect a *fixture trap* to a *fixture drain* in an *accessible* location.

7.3.3.5. Increaser or Reducer

(1) Every connection between two pipes of different *size* shall be made with an increaser or a reducer fitting installed so that it will permit the system to be completely drained.

7.3.3.6. Connection of Dissimilar Materials

(1) Adapters, connectors or mechanical joints used to join dissimilar materials shall be designed to accommodate the required transition.

7.3.3.7. Connection of Roof Drain to Leader

(1) Every *roof drain* shall be securely connected to a *leader* and provision shall be made for expansion.

7.3.3.8. Connection of Floor Outlet Fixtures

(1) Every pedestal urinal, floor-mounted water closet or S-*trap standard* shall be connected to a *fixture drain* by a floor flange, except that a cast iron *trap standard* may be caulked to a cast iron pipe.

(2) Except as provided in Sentence (3), every floor flange shall be of brass.

(3) Where cast iron or plastic pipe is used, a floor flange of the same material may be used.

(4) Every floor flange shall be securely set on a firm base and bolted to the *trap* flange of the *fixture*, and every joint shall be sealed with a natural rubber, synthetic rubber gasket, or with a closet setting compound.

(5) Where a lead water closet stub is used, the length of the stub below the floor flange shall be at least 75 mm.

7.3.3.9. Expansion and Contraction

(1) The design and installation of every piping system shall, where necessary, include means to accommodate expansion and contraction of the piping system caused by temperature change or *building* shrinkage.

7.3.3.10. Copper Tube

(1) Types M and DWV copper tube shall not be bent.

(2) Bends in copper tubing of soft or bending temper shall be made with tools manufactured and sized for the purpose.

7.3.3.11. Indirect Connections

(1) Where a *fixture* or device is *indirectly connected*, the connections shall be made by terminating the *fixture drain* above the *flood level rim* of a *directly connected fixture* to form an *air break*.

(2) The size of the *air break* shall be at least 25 mm.

7.3.4. Support of Piping

7.3.4.1. Capability of Support

(1) Piping shall be provided with support that is capable of keeping the pipe in alignment and bearing the weight of the pipe and its contents.

(2) Every floor or wall mounted water closet bowl shall be securely attached to the floor or wall by means of a flange and shall be stable.

(3) Every wall mounted *fixture* shall be supported so that no strain is transmitted to the piping.

7.3.4.2. Independence of Support

(1) Piping, *fixtures*, tanks or devices shall be supported independently of each other.

7.3.4.3. Insulation of Support

(1) Where a hanger or support for copper tube or brass or copper pipe is of a material other than brass or copper, it shall be suitably separated and electrically insulated from the pipe to prevent galvanic action.

7.3.4.4. Support for Vertical Piping

(1) Except as provided in Sentence (2), vertical piping shall be supported at its base and at the floor level of alternate *storeys* by rests, each of which can bear the weight of pipe that is between it and the rest above it.

(2) The maximum spacing of supports shall be 7.5 m.

7.3.4.5. Support for Horizontal Piping

(1) *Nominally horizontal* piping that is inside a *building* shall be braced to prevent swaying and buckling and to control the effects of thrust.

(2) *Nominally horizontal* piping shall be supported so that,

(a) galvanized iron or steel pipe is supported at intervals not exceeding,
  (i) 3.75 m if the pipe *size* is 6 in. or more, and
  (ii) 2 500 mm if the pipe *size* is less than 6 in.,

(b) lead pipe is supported throughout its length,

(c) cast iron pipe is supported,
  (i) at or adjacent to each hub or joint,
  (ii) at intervals not exceeding 3 m, and
  (iii) at intervals not exceeding 1 000 mm if the pipe has mechanical joints and the length of pipe between adjacent fittings is 300 mm or less,

(d) asbestos-cement pipe is supported,
  (i) at intervals not exceeding 2 000 mm or have two supports for every 4 m length of pipe, and
  (ii) at intervals not exceeding 1 000 mm where the length of pipe between adjacent fittings is 300 mm or less,

(e) ABS or PVC plastic DWV pipe is supported,
  (i) at intervals not exceeding 1 200 mm,
  (ii) at the ends of *branches*,
  (iii) at changes of direction or elevation, and
  (iv) if the pipe is a *fixture drain* that is more than 1 000 mm in length, as close as possible to the *trap*,

(f) plastic water pipe is supported at intervals not exceeding 1 000 mm,

(g) copper tube and copper and brass pipe is supported at intervals not exceeding,
  (i) 3 m if the tube or pipe is hard temper and larger than 1 in. in *size*,
  (ii) 2 500 mm if the tube or pipe is hard temper and 1 in. in *size* or less, and
  (iii) 2 500 mm if the tube is soft temper,

(h) aluminum DWV pipe is supported,
  (i) at intervals not greater than 3 m,
  (ii) at both sides of all joints,
  (iii) at all *branch* ends,
  (iv) at all points where there is a change in direction, and
  (v) as close to all *traps* as possible,

(i) supports and hangers for aluminum DWV pipe shall have a broad support base and shall be free of burrs and rough edges to prevent abrasion of the pipe,

(j) where joints in the piping are less rigid than the pipe, the support points shall be selected so as to minimize the shear and bending forces imposed on the joints,

(k) PE/AL/PE or PEX/AL/PEX composite pipe is supported at intervals not exceeding 1 000 mm, and

(l) PP-R plastic pipe is supported,

  (i) at intervals not exceeding 1 000 mm,

  (ii) at the end of *branches*, and

  (iii) at changes of direction and elevation.

(3) Where plastic pipe or a composite pipe incorporating a plastic component is installed,

(a) the pipe shall be aligned without added strain on the piping,

(b) the pipe shall not be bent or pulled into position after being welded or joined, and

(c) hangers shall not compress, cut or abrade the pipe.

(4) Reserved

(5) Where hangers are used to support *nominally horizontal* piping they shall be,

(a) hangers with metal rods of not less than,

  (i) 6 mm diam for supporting pipe 2 in. or less in size,

  (ii) 8 mm diam for supporting pipe 4 in. or less in size, and

  (iii) 13 mm diam for supporting pipe over 4 in. in size, or

(b) solid or perforated metal straps not less than,

  (i) 0.6 mm nominal thickness, 12 mm wide for pipe 2 in. or less in size, and

  (ii) 0.8 mm nominal thickness, 18 mm wide for pipe 4 in. or less in size.

(6) Where a hanger is attached to concrete or masonry, it shall be fastened by metal or expansion-type plugs that are inserted or built into the concrete or masonry.

7.3.4.6. Support for Underground Horizontal Piping

(1) Except as provided in Sentence (2), *nominally horizontal* piping that is underground shall be supported on a base that is firm and continuous under the whole of the pipe.

(2) *Nominally horizontal* piping installed underground that is not supported as described in Sentence (1) may be installed using hangers fixed to a foundation or structural slab provided that the hangers are capable of,

(a) keeping the pipe in alignment, and

(b) supporting the weight,

  (i) of the pipe,

  (ii) its contents, and

  (iii) the fill over the pipe.

7.3.4.7. Support for Vent Pipe Above a Roof

(1) Where a *vent pipe* terminates above the surface of a roof it shall be supported or braced to prevent misalignment.

7.3.4.8. Compression Fittings

(1) No compression fitting connecting to plain end pipe or tube shall be used in a *plumbing system* unless the pipe or tube and fittings are sufficiently stayed, clamped, anchored or buttressed so as to prevent separation during normal service of the system allowing for surge pressures.

7.3.4.9. Thrust Restraint of Water Service Pipes

(1) Pipe clamps and tie-rods, thrust blocks, locked mechanical or push-on joints, mechanical joints utilizing set screw retainer glands, or other suitable means of thrust restraint shall be provided at each change of direction of a *water service pipe* 4 in. or more in *size* and at all tees, plugs, caps and bends.

(2) Backing for underground *water service pipes* shall be placed,

(a) between undisturbed earth and the fitting to be restrained and shall be of sufficient bearing area to provide adequate resistance to the thrust to be encountered, and

(b) so that the joints will be *accessible* for inspection and repair.

(3) Concrete thrust blocks shall have a minimum compressive strength of not less than 10 MPa after 28 days.

(4) Thrust blocks shall not be used to restrain vertical pipe.

7.3.5. Protection of Piping

7.3.5.1. Backfill of Pipe Trench

(1) Where piping is installed underground, the backfill shall be carefully placed and tamped to a height of 300 mm over the top of the pipe and shall be free of stones, boulders, cinders and frozen earth.

7.3.5.2. Protection of Non-Metallic Pipe

(1) Where asbestos-cement drainage pipe or vitrified clay is located less than 600 mm below a basement floor and the floor is constructed of other than 75 mm or more of concrete, the pipe shall be protected by a 75 mm layer of concrete installed above the pipe.

7.3.5.3. Isolation from Loads

(1) Where piping passes through or under a wall it shall be installed so that the wall does not bear on the pipe.

7.3.5.4. Protection from Frost

(1) Where piping may be exposed to freezing conditions it shall be protected from the effects of freezing.

7.3.5.5. Protection from Mechanical Damage

(1) *Plumbing*, piping and equipment exposed to mechanical damage shall be protected.

7.3.5.6. Protection from Condensation

(1) Piping used for internal *leaders*, which may be subject to condensation, shall be installed in a manner that limits the risk of damage to the *building* due to condensation.

7.3.5.7. Spatial Separation

(1) Except as permitted in Sentence (2), a buried *water service pipe* shall be separated from the *building drain*, *building sewer* and a *private sewage disposal system*, by not less than 2 440 mm measured horizontally, of undisturbed or compacted earth.

(2) The *water service pipe* may be closer than 2 440 mm or be placed in the same trench with the *building drain* or *building sewer* if,

(a) the following conditions are met:

(i) the bottom of the *water service pipe* at all points is at least 500 mm above the top of the *building drain* or *building sewer*, and

(ii) when in a common trench with the *building drain* or *building sewer*, the *water service pipe* is placed on a shelf at one side of the common trench,

(b) the *water service pipe* is constructed of a single run of pipe with no joints or fittings between the street line or source of supply on the property and the inside face of the *building*, or

(c) the *building drain* or *building sewer* is constructed of piping which is pressure tested in accordance with Subsection 7.3.7. at 345 kPa.

(3) A buried *water service pipe* shall be constructed of a single run of pipe with no joints or fittings between the street line or source of supply on the property and the inside face of the *building* if the *water service pipe* is less than 15 m from,

(a) a *private sewage disposal system*, or

(b) a source of pollution other than a *private sewage disposal system*.

7.3.6. Testing of Drainage and Venting Systems

7.3.6.1. Tests and Inspection of Drainage or Venting Systems

(1) Except in the case of an external *leader*, after a section of *drainage system* or a *venting system* has been roughed in, and before any *fixture* is installed or piping is covered, a water or an air test shall be conducted.

(2) Where a *chief building official* requires a final test, it shall be carried out after every *fixture* is installed and before any part of the *drainage system* or *venting system* is placed in operation.

(3) Where a prefabricated system is assembled off the *building* site in such a manner that it cannot be inspected and tested on site, off-site inspections and tests shall be conducted.

(4) Where a prefabricated system is installed as part of a *drainage system* and *venting system*, all other *plumbing* work shall be tested and inspected and a final test shall be carried out on the complete system.

(5) A ball test shall be carried out on a *sanitary building drain*, *sanitary building sewer*, *storm building drain* and a *storm building sewer* buried underground.

7.3.6.2. Tests of Pipes in Drainage Systems

(1) Every pipe in a *drainage system*, except an external *leader* or *fixture outlet pipe*, shall be capable of withstanding without leakage a water test, air test and final test.

7.3.6.3. Tests of Venting Systems

(1) Every *venting system* shall be capable of withstanding without leakage a water test, air test and final test.

7.3.6.4. Water Tests in Drain, Waste and Vent Systems

(1) Where a water test is made, all joints shall be tested with a water column of not less than 3 m.

(2) In making a water test,

(a) every opening except the highest shall be tightly closed with a testing plug or a test cap, and

(b) the system or the section shall be kept filled with water for 15 min.

7.3.6.5. Air Tests

(1) Where an air test is made, it shall be conducted in accordance with the manufacturer's instructions for the piping materials, and,

(a) air shall be forced into the system until a gauge pressure of 35 kPa is created, and

(b) this pressure shall be maintained for at least 15 min without a drop in pressure.

7.3.6.6. Final Tests

(1) Where a final test is made,

(a) every *trap* shall be filled with water,

(b) the bottom of the system being tested shall terminate at the *building trap*, test plug or cap,

(c) except as provided in Sentence (2), smoke from smoke-generating machines shall be forced into the system,

(d) when the smoke appears from all roof terminals they shall be closed, and

(e) a pressure equivalent to a 25 mm water column shall be maintained for 15 min without the addition of more smoke.

(2) The smoke referred to in Clauses (1)(c) and (d) may be omitted provided the roof terminals are closed and the system is subjected to an air pressure equivalent to a 25 mm water column maintained for 15 min without the addition of more air.

7.3.6.7. Ball Tests

(1) Where a ball test is made, a hard ball dense enough not to float shall be rolled through the pipe.

(2) The diameter of the ball shall be not less than 50 mm where the *size* of the pipe is 4 in. or more.

7.3.7. Testing of Potable Water Systems

7.3.7.1. Application of Tests

(1) After a section of a *potable water system* has been completed, and before it is placed in operation, a water test or an air test shall be conducted.

(2) A test may be applied to each section of the system or to the system as a whole.

(3) Where a prefabricated system is assembled off the *building* site in such a manner that it cannot be inspected and tested on site, off-site inspections and tests shall be conducted.

(4) Where a prefabricated system is installed as part of a *water system*,

(a) all other *plumbing* work shall be tested and inspected, and

(b) the complete system shall be pressure tested.

7.3.7.2. Tests of Potable Water Systems

(1) Every *potable water system* shall be capable of,

(a) withstanding without leakage a water pressure that is at least 1000 kPa for at least 1 h, or

(b) withstanding for at least 2 h without a drop in pressure an air pressure that is at least 700 kPa.

7.3.7.3. Water Tests

(1) Where a water test is made all air shall be expelled from the system before *fixture* control valves or faucets are closed.

(2) *Potable* water shall be used to test a *potable water system*.

Section 7.4. Drainage Systems

7.4.1. Application

7.4.1.1. Application of Drainage Systems

(1) This Section applies to *sanitary drainage systems* and *storm drainage systems*.

7.4.2. Connections to Drainage Systems

7.4.2.1. Connections to Sanitary Drainage Systems

(1) Every *fixture* shall be directly connected to a *sanitary drainage system*, except that,

(a) drinking fountains may be,

  (i) *indirectly connected* to a *sanitary drainage system*, or

  (ii) connected to a *storm drainage system* provided that where the system is subject to *backflow*, a *check valve* is installed in the fountain *waste pipe*,

(b) laundry *plumbing appliances* may be *indirectly connected* to a *sanitary drainage system*,

(c) *fixtures* or *plumbing appliances*, other than floor drains, except as provided in Sentence 7.1.4.2.(2), that discharge only *clear water waste* may be connected to a *storm drainage system*,

(d) the following devices shall be *indirectly connected* to a *drainage system*:

  (i) a device for the display, storage, preparation or processing of food or drink,

  (ii) a sterilizer,

  (iii) a device that uses water as a cooling or heating medium,

  (iv) a water operated device,

  (v) a water treatment device,

  (vi) a drain or overflow from a *water system* or a heating system, or

  (vii) a drain line from a HVAC system or equipment,

(e) *fixtures* that have a hydraulic load totaling not more than 1 ½ *fixture units* may be connected to a vertical section of a *circuit vent* provided,

  (i) the *fixtures* are located in the same *storey* as the *fixtures* served by the *vent pipes*,

  (ii) not more than 2 *fixtures* are connected to the *vent pipe*, and

  (iii) where 2 *fixtures* are connected to the *vent pipe*, the connection is done with a double fitting in conformance with Table 7.2.4.5.,

(f) *fixtures* that have a hydraulic load totaling not more than 1 ½ *fixture units* may be connected to the vertical section of a *yoke vent* provided,

  (i) not more than 2 *fixtures* are connected to the *vent pipe*, and

  (ii) where 2 *fixtures* are connected to the *vent pipe*, the connection is done with a double fitting in conformance with Table 7.2.4.5.,

(g) *fixtures* may be connected to a *vent stack* provided,

  (i) the total hydraulic load of the connected *fixtures* does not exceed 8 *fixture units*,

  (ii) at least 1 *fixture* is connected to a vertical portion of the *vent stack* and upstream of any other *fixtures*,

  (iii) no other *fixture* is connected downstream of a water closet, and

  (iv) all *fixtures* are located in the lowest *storey* served by the *vent stack*, and

(h) floor drains within walk-in coolers shall be connected to a *sanitary drainage system*,

(i) indirectly with an *air break*, or

(ii) directly with a *backwater valve* installed on the *drainage system* before connection to the *sanitary building drain*.

(2) The connection of a *soil* or *waste pipe* to a *nominally horizontal soil* or *waste pipe* or to a *nominally horizontal offset* in a *soil* or *waste stack* shall be respectively at least 1 500 mm measured horizontally from the bottom of a *soil* or *waste stack* or from the bottom of the upper vertical section of the *soil* or *waste stack* that,

(a) receives a discharge of 30 or more *fixture units*, or

(b) receives a discharge from *fixtures* located on 2 or more *storeys*.

(3) No other *fixture* shall be connected to a lead bend or stub that serves a water closet.

(4) A *soil* or *waste pipe* that serves more than one clothes washer, and in which pressure zones are created by detergent suds, shall not serve for connecting other *soil* or *waste pipes*.

7.4.2.2. Connection of Overflows from Rainwater Tanks

(1) An overflow from a rainwater tank shall not be *directly connected* to a *storm drainage system*.

7.4.2.3. Direct Connections

(1) Two or more *fixture outlet pipes* that serve outlets from a single *fixture* that is listed in Clause 7.4.2.1.(1)(d) may be *directly connected* to a *branch* that,

(a) has a *size* of at least 1 ¼ in., and

(b) is terminated above the *flood level rim* of a *directly connected fixture* with a minimum diameter waste of 1 ½ in. to form an *air break*.

(2) *Fixture drains* from *fixtures* that are listed in Subclauses 7.4.2.1.(1)(d)(i) and (ii) may be *directly connected* to a pipe that,

(a) is terminated to form an *air break* above the *flood level rim* of a *fixture* that is *directly connected to* a *sanitary drainage system*, and

(b) is extended through the roof when *fixtures* that are on 3 or more *storeys* are connected to it.

(3) *Fixture drains* from *fixtures* that are listed in Subclauses 7.4.2.1.(1)(d)(iii) to (vi) may be *directly connected* to a pipe that,

(a) is terminated to form an *air break* above the *flood level rim* of a *fixture* that is *directly connected* to a *storm drainage system*, and

(b) is extended through the roof when *fixtures* that are on 3 or more *storeys* are connected to it.

(4) Every *waste pipe* carrying waste from a device for the display, storage, preparation or processing of food or drink, shall be trapped and have a minimum diameter equal to the diameter of the drain outlet from the device.

7.4.3. Location of Fixtures

7.4.3.1. Plumbing Fixtures

(1) *Sanitary units*, bathtubs and shower baths shall not be installed adjacent to wall and floor surfaces that are pervious to water.

7.4.3.2. Restricted Locations of Indirect Connections and Traps

(1) Indirect connections or any *trap* that may overflow shall not be located in a crawl space or any other unfrequented area.

7.4.3.3. Equipment Restrictions Upstream of Interceptors

(1) Except as provided in Sentence (2), equipment discharging waste with organic solids shall not be located upstream of an *interceptor*.

(2) If a food scrap *interceptor* has been installed upstream of the grease *interceptor*, equipment discharging waste with organic solids may discharge through a grease *interceptor*.

7.4.3.4. Fixtures Located in Chemical Storage Locations

(1) A floor drain or other *fixture* located in an oil transformer vault, a high voltage room or any room where flammable, dangerous or toxic chemicals are stored or handled shall not be connected to a *drainage system*.

7.4.3.5. Macerating Toilet System

(1) A maceration toilet system shall only be installed,

(a) where no connection to a gravity *sanitary drainage system* is available, and

(b) in accordance with the manufacturer's instructions.

7.4.3.6. Drains Serving Elevator Pits

(1) If a floor drain is provided in an elevator pit, it shall be installed in accordance with Section 2.7. of the CSA B44, "Safety Code for Elevators".

7.4.4. Treatment of Sewage and Wastes

7.4.4.1. Sewage Treatment

(1) Where a *fixture* or equipment discharges *sewage* or waste that may damage or impair the *sanitary drainage system* or the functioning of a *sanitary sewage* works or *sanitary sewage* system, provision shall be made for treatment of the *sewage* or waste before it is discharged to the *sanitary drainage system*.

7.4.4.2. Protection for Drainage System

(1) Where a *fixture* discharges *sewage* or *clear water waste* that has been heated, the *drainage system* shall be suitable for the temperature of the *sewage* or *clear water waste* being discharged.

7.4.4.3. Interceptors

(1) Except for *suites* of *residential occupancy*, where a *fixture* discharges *sewage* that includes fats, oils or grease and is located in an area that food is cooked, processed or prepared, it shall discharge through a grease *interceptor*.

(2) Except as provided in Sentence (3), oil *interceptors* shall be provided as follows:

(a) service stations, repair shops and garages or any establishment where motor vehicles are repaired, lubricated or maintained shall be provided with an oil *interceptor*, and

(b) establishments which use oily or flammable liquids or have such wastes as a result of an industrial process shall be provided with an engineered oil *interceptor*.

(3) Oil *interceptors* are not required for a drain in a hydraulic elevator pit, parking lot, car wash or a garage used exclusively as a motor vehicle parking area.

(4) Where a *fixture* discharges sand, grit or similar materials, an *interceptor* designed for the purpose of intercepting such discharges shall be installed.

(5) Every *interceptor* shall have sufficient capacity to perform the service for which it is provided.

(6) An on site constructed *interceptor* shall be constructed to the requirements of a manufactured *interceptor*.

(7) A grease *interceptor* shall be located as close as possible to the *fixture* or *fixtures* it serves.

(8) The flow rate through a grease *interceptor* shall not exceed its rated capacity and the flow rate shall be determined using the following:

$$Q = (\sum_{1}^{N}(0.75\frac{V}{DDT})) + PD$$

where:

Q is the flow rate to a grease interceptor in L/s.

V is the volume of the fixture in L.

DDT is the drain down time, 60 or 120 seconds

PD is any pump discharge in L/s.

N is the number of fixtures to go through the interceptor.

(9) All grease and oil *interceptors* shall have an internal flow control and where the head will exceed five feet, a secondary flow control shall be required.

(10) Floor drains that conform to Sentence 7.4.5.1.(3) are not required to be separately trapped and vented, and may be gang trapped when discharging through an oil *interceptor*.

7.4.4.4. Neutralizing and Dilution Tanks

(1) Where a *fixture* or equipment discharges corrosive or acid waste, it shall discharge into a neutralizing or diluting tank that is connected to the *sanitary drainage system* through,

(a) a *trap*, or

(b) *indirect connection*.

(2) Each neutralizing or diluting tank shall have a method for neutralizing the liquid.

7.4.5. Traps

7.4.5.1. Traps for Sanitary Drainage Systems

(1) Except as provided in Sentences (2) and (3) and Article 7.4.5.2., every *fixture* shall be protected by a separate *trap*.

(2) One *trap* may protect,

(a) all the trays or compartments of a two or three compartment sink,

(b) a two or three compartment laundry tray, or

(c) two similar type single compartment *fixtures* located in the same room.

(3) One *trap* may serve a group of floor drains and *hub drains*, a group of shower drains, a group of washing machines or a group of laboratory sinks if the *fixtures*,

(a) are in the same room, and

(b) are not located where they can receive food or other organic matter.

(4) Reserved

(5) A grease *interceptor* shall not serve as a *fixture trap* and each *fixture* discharging through the *interceptor* shall be trapped and vented.

(6) Where a domestic dishwashing machine equipped with a drainage pump discharges through a direct connection into the *fixture outlet pipe* of an adjacent kitchen sink or disposal unit, the pump discharge line shall,

(a) rise as high as possible to just under the counter, and

(b) connect,

  (i) on the inlet side of the sink *trap* by means of a Y fitting, or

  (ii) to the disposal unit.

7.4.5.2. Traps for Storm Drainage Systems

(1) Where a *storm drainage system* is connected to a public combined sewer, a *trap* shall be installed between any opening in the system and the drain or sewer, except that no *trap* is required if the opening is the upper end of a *leader* that terminates,

(a) at a roof that is used only for weather protection, and

(b) not less than 1 000 mm above or not less than 3.5 m in any other direction from any air inlet, openable window or door, and

(c) not less than 1 800 mm from a property line.

7.4.5.3. Connection of Subsoil Drainage Pipe to a Sanitary Drainage System

(1) Except as permitted in Sentence (2), no foundation drain or *subsoil drainage pipe* shall connect to a *sanitary drainage system*.

(2) Where a *storm drainage system* is not available or *soil* conditions prevent drainage to a culvert or dry well, a foundation drain or *subsoil drainage pipe* may connect to a *sanitary drainage system*.

(3) Where a *subsoil drainage pipe* may be connected to a *sanitary drainage system*, the connection shall be made on the upstream side of a *trap* with a *cleanout* or a trapped sump.

7.4.5.4. Location and Cleanout for Building Traps

(1) Where a *building trap* is installed it shall,

(a) be provided with a *cleanout* fitting on the upstream side of and directly over the *trap*,

(b) be located upstream of the *building cleanout*, and

(c) be located,

  (i) inside the *building* as close as practical to the place where the *building drain* leaves the *building*, or

  (ii) outside the *building* in a manhole.

7.4.5.5. Trap Seals

(1) Provision shall be made for maintaining the *trap* seal of a floor drain or a *hub drain* by the use of a *trap* seal primer, by using the drain as a receptacle for an *indirectly connected* drinking fountain, or by equally effective means.

(2) Where a mechanical device is installed to furnish water to a *trap*, the pipe or tube conveying water from the device to the *trap* shall be at least 3/8 in. inside diameter.

7.4.6. Arrangement of Drainage Piping

7.4.6.1. Separate Systems

(1) No vertical *soil* or *waste pipe* shall conduct both *sanitary sewage* and *storm sewage*.

(2) There shall be no unused open ends in a *drainage system* and *dead ends* shall be so graded that water will not collect in them.

7.4.6.2. Location of Soil or Waste Pipes

(1) A *soil* or *waste pipe* shall not be located directly above,

(a) non-pressure *potable* water storage tanks,

(b) manholes in pressure *potable* water storage tanks, or

(c) food-handling or processing equipment.

7.4.6.3. Sumps or Tanks

(1) Only piping that is too low to drain into a *building sewer* by gravity shall be drained to a sump or receiving tank.

(2) Where the sump or tank receives *sanitary sewage* it shall be water and air-tight and shall be vented.

(3) Equipment such as a pump or ejector that can lift the contents of the sump or tank and discharge it into the *sanitary building drain* or *sanitary building sewer* shall be installed.

(4) Where the equipment does not operate automatically the *capacity* of the sump shall be sufficient to hold at least a 24 hours accumulation of liquid.

(5) Where there is a *building trap* the discharge pipe from the equipment shall be connected to the *sanitary building drain* downstream of the *trap*.

(6) The discharge pipe from every pumped *sanitary sewage* sump shall be equipped with a union, a *check valve* and a shut-off valve installed in that sequence in the direction of discharge.

(7) The discharge piping from a pump or ejector shall be sized for optimum flow velocities at pump design conditions.

(8) The discharge pipe from every pumped *storm sewage* sump shall be equipped with,

(a) a union and a *check valve* installed in that sequence in the direction of discharge and pumped to above grade level, or

(b) a union, a *check valve* and a shut off valve installed in that sequence in the direction of discharge.

7.4.6.4. Protection from Backflow

(1) Except as permitted in Sentence (2), a *backwater valve* that would prevent free circulation of air shall not be installed in a *building drain* or in a *building sewer*.

(2) A *backwater valve* may be installed in a *building drain* provided that,

(a) it is a "normally open" design conforming to,

- (i) CAN/CSA-B70, "Cast Iron Soil Pipe, Fittings, and Means of Joining",
- (ii) CAN/CSA-B181.1, "ABS Drain, Waste, and Vent Pipe and Pipe Fittings",
- (iii) CAN/CSA-B 181.2, "PVC Drain, Waste, and Vent Pipe and Pipe Fittings", or
- (iv) CAN/CSA-B182.1, "Plastic Drain and Sewer Pipe and Pipe Fittings", and

(b) it does not serve more than one *dwelling unit*.

(3) Except as provided in Sentences (4) and (5), where a *building drain* or a *branch* may be subject to *backflow*, a *backwater valve* shall be installed on every *fixture drain* connected to them when the *fixture* is located below the level of the adjoining street.

(4) Where more than one *fixture* is located on a *storey* and all are connected to the same *branch*, the *backwater valve* may be installed on the *branch*.

(5) A *subsoil drainage pipe* that drains into a *sanitary drainage system* that is subject to surcharge shall be connected in such a manner that *sewage* cannot back up into the *subsoil drainage pipe*.

7.4.6.5. Mobile Home Sewer Service

(1) A *building sewer* intended to serve a mobile home shall,

(a) be not less than 4 in. in *size*,

(b) be terminated above ground,

(c) be provided with,
  (i) a tamperproof terminal connection that is capable of being repeatedly connected, disconnected and sealed,
  (ii) a protective concrete pad, and
  (iii) a means to protect it from frost heave, and

(d) be designed and constructed in accordance with good engineering practice.

7.4.6.6. Building Drain Ends

(1) Where a *building drain* enters a *building* above the elevation of the bottom of the wall of a *building*, the *building drain* may be deemed to terminate at the first point that the drainage pipe changes direction from the horizontal to the vertical.

7.4.7. Cleanouts

7.4.7.1. Cleanouts for Drainage Systems

(1) Every *sanitary drainage system* and *storm drainage system* shall be provided with *cleanouts* that will permit cleaning of the entire system.

(2) A *cleanout* fitting shall be provided on the upstream side and directly over every running *trap*.

(3) Every interior *leader* shall be provided with a *cleanout* fitting at the bottom of the *leader* or not more than 1 000 mm upstream from the bottom of the *leader*.

(4) Where a *cleanout* is required on a *building sewer* 8 in. or larger in *size*, it shall be a manhole.

(5) Where there is a change of direction greater than 45° in a *sanitary building drain* or a *sanitary building sewer*, a *cleanout* shall be installed at each change in direction.

(6) Every *sanitary building drain* or *storm building drain* shall be provided with a *cleanout* fitting that is located as close as practical to the place where the drain leaves the *building*.

(7) Every *soil* or *waste stack* shall be provided with a *cleanout* fitting,

(a) at the bottom of the stack,

(b) not more than 1 000 mm upstream of the bottom of the stack, or

(c) on a Y fitting connecting the stack to the *building drain* or *branch*.

(8) A *cleanout* shall be provided to permit the cleaning of the piping immediately downstream of an *interceptor*.

(9) Every indirect drainage pipe carrying waste from a food receptacle shall have a *cleanout* access at every change of direction of more than 45°.

(10) A *cleanout* shall be installed on a *fixture drain* serving a kitchen sink.

7.4.7.2. Size and Spacing of Cleanouts

(1) Except as provided in Sentences (2) and (3), on drainage piping of 4 in. *size* and smaller, the minimum *size cleanout* opening shall be the same *size* as the drainage pipe and on drainage piping larger than the 4 in. *size*, the *cleanout* opening shall be 4 in. or larger and the maximum spacing between *cleanouts* on horizontal pipe shall be,

(a) in the case of a sink *waste pipe*, 6 m,

(b) in the case of a horizontal *sanitary drainage pipe*, or *storm drainage pipe*, other than a *waste pipe* from a sink, 15 m, and

(c) in the case of a horizontal *sanitary drainage pipe* or *storm drainage pipe* larger than 4 in. *size*, 30 m.

(2) The spacing between manholes serving a *building sewer*,

(a) 24 in. or less in *size* shall not exceed 90 m, and

(b) over 24 in. in *size* shall not exceed 150 m.

(3) The *developed length* of a *building sewer* between the *building* and the first manhole to which the *building sewer* connects shall not exceed 30 m.

(4) *Cleanouts* that allow rodding in one direction only shall be installed to permit rodding in the direction of flow.

(5) Manholes shall be located at all junctions, all changes in grade, *size* or alignment (except for curvilinear alignment) on a *sanitary building sewer* that is 8 in. or larger in *size*.

(6) Manholes shall be located at changes of grade, *size* or alignment (except for curvilinear alignment) on a *storm building sewer* or *storm drainage piping* that is 8 in. or larger in *size*.

7.4.7.3. Manholes

(1) A manhole including the cover shall be designed to support all loads imposed upon it.

(2) A manhole shall be provided with,

(a) a cover which shall provide an airtight seal if located within a *building*,

(b) a rigid ladder of a corrosion-resistant material where the depth exceeds 1 000 mm, and

(c) a vent to the exterior if the manhole is located within a *building*.

(3) A manhole shall have a minimum horizontal dimension of 1 200 mm, except that the top 1 500 mm may be tapered from 1 200 mm down to a minimum of 600 mm at the top.

(4) A manhole in a *sanitary drainage system* shall be channelled to direct the flow of effluent.

7.4.7.4. Location of Cleanouts

(1) *Cleanouts* and access covers shall be located so that the openings are readily *accessible* for drain cleaning purposes.

(2) A *cleanout* shall not be located in a floor assembly in a manner that may constitute a hazard and shall not be used as a floor drain.

(3) Reserved

(4) Each change of direction of the piping between a *cleanout* fitting and the drainage piping or *vent piping* that is serves shall be accomplished by using 45° bends.

(5) A *cleanout* shall be provided to serve vertical drainage piping from a wall hung urinal and shall extend above the *flood level rim* of the *fixture*.

(6) A *cleanout* serving a *fixture* in health care facilities, mortuaries, laboratories and similar *occupancies*, where contamination by body fluids is likely, shall be located a minimum of 150 mm above the *flood level rim* of the *fixture*.

7.4.8. Minimum Slope and Length of Drainage Pipes

7.4.8.1. Minimum Slope

(1) Except as provided in Sentences (2) and (3), every drainage pipe that has a *size* of 3 in. or less, and every *fixture drain* shall have a downward slope in the direction of flow of at least 1 in 50.

(2) Sentence (1) does not apply to a *force main*.

(3) Where it is not possible to comply with Sentence (1), a lesser slope may be used if it will produce a gravity flow of not less than 0.6 m per second.

7.4.8.2. Length of Fixture Outlet Pipes

(1) Except for *fixture outlet pipes* installed in conformance with Sentence 7.4.5.1.(3), the *developed length* of every *fixture outlet pipe* shall not exceed 1 200 mm.

7.4.9. Size of Drainage Pipes

7.4.9.1. No Reduction in Size

(1) Except as permitted in Sentence (3), no drainage pipe that is of minimum *size* required by this Part for the purpose for which it is installed shall be so connected as to drain to other drainage pipe of lesser *size*.

(2) Where a *building drain* connects to a stack through a wall or floor, the drain shall retain its full *size* through the wall or floor.

(3) A *sanitary drainage pipe* may be connected to a pre-engineered waste water heat recovery system that incorporates piping of a lesser *size* than required by Sentence (1) provided that it does not convey *sewage*,

(a) from a *sanitary unit*, or

(b) that contains solids.

7.4.9.2. Serving Water Closets

(1) The *size* of every drainage pipe that serves a water closet shall be at least 3 in.

(2) The *size* of every horizontal drainage pipe downstream of the third water closet *fixture drain* connection shall be at least 4 in.

(3) The *size* of every *soil stack* that serves more than 6 water closets shall be at least 4 in.

(4) The discharge pipe serving a macerating toilet shall be not less than 3/4 in. *size* with a hydraulic load of 4 *fixture units*.

7.4.9.3. Size of Fixture Outlet Pipes

(1) Except as provided in Sentence (2) the *size* of every *fixture outlet pipe* shall conform to Table 7.4.9.3.

Table 7.4.9.3.
Minimum Permitted Size of Fixture Outlet Pipe and Hydraulic Loads for Fixtures

Forming Part of Sentence 7.4.9.3.(1) and 7.4.10.2.(1)

COLUMN 1	COLUMN 2	COLUMN 3
Fixture	Minimum *Size of Fixture Outlet Pipe*, in.	Hydraulic Load, *fixture units*
Autopsy table	1 ½	2
Bathroom group		
(a) with flush tank		6
(b) with direct flush valve		8
Bathtub (with or without shower)	1 ½	1 ½
Bath: foot, sitz or slab	1 ½	1 ½
Bed pan washer	3	6
Beer cabinet	1 ½	1 ½
Bidet	1 ¼	1
Chinese range	1 ½	3
Clothes washer		
(a) domestic	N/A	1 ½ with 1 ½ in. *trap*
(b) commercial	N/A	2 with 1 ½ in. *trap*
Cup Sinks	1 ¼	½
Dental unit or cuspidor	1 ¼	1
Dishwasher		
(a) domestic	1 ½	1 (no load if connected to garbage grinder or domestic sink)
(b) commercial type	2	3
Drinking fountain	1 ¼	½
Fish tank or tray	1 ½	1½
Floor drain	2	2 with 2 in. *trap* 3 with 3 in. *trap*
Garbage grinder, commercial type	2	3
Icebox	1 ¼	1
Laundry tray		
(a) single or double units or 2 single units with common *trap*	1 ½	1 ½
(b) 3 compartments	1 ½	2
Lavatory		
(a) barber or beauty parlor	1 ½	1 ½
(b) dental	1 ¼	1
(c) domestic type single, or 2 single with common *trap*	1 ¼	1 with 1 ¼ in. *trap* 1 ½ with 1 ½ in. *trap*
(d) multiple or industrial type	1 ½	3
Macerating Toilet System for single bathroom	See Sentence 7.4.9.2.(4)	4
Potato Peeler	2	3
Shower drain		
(a) from 1 head	1 ½	1 ½
(b) from 2 or 3 heads	2	3
(c) from 4 to 6 heads	3	6
Sink		
(a) domestic and other small type with or without garbage grinders, single, double or 2 single with a common trap	1 ½	1 ½
(b) other sinks	1 ½	1 ½ with 1 ½ in. trap 2 with 2 in. trap 3 with 3 in. trap
Urinal		
(a) pedestal, siphon jet or blowout type	2	4
(b) stall, washout type	2	2
(c) wall		
(i) washout type	1 ½	1 ½
(ii) other types	2	3

COLUMN 1	COLUMN 2	COLUMN 3
Fixture	Minimum *Size* of *Fixture Outlet Pipe*, in.	Hydraulic Load, *fixture units*
Water closet		
(a) with flush tank	3	4
(b) with direct flush	3	6

(2) The part of the *fixture outlet pipe* that is common to 3 compartments of a sink shall be one *size* larger than the largest *fixture outlet pipe* of the compartments that it serves.

(3) Where clothes washers do not drain to a laundry tray, the *trap* inlet shall be fitted with a vertical standpipe that is not less than 600 mm long measured from the *trap weir* and the top of the standpipe shall terminate above the *flood level rim* of the clothes washer it serves.

7.4.9.4. Minimum Size of Building Drains and Sewers

(1) Every *sanitary building drain* and every *sanitary building sewer* shall be at least 4 in. *size*.

(2) Every *storm building drain* and every *storm building sewer* shall be at least 4 in. *size*.

7.4.10. Hydraulic Loads

7.4.10.1. Total Load on a Pipe

(1) The hydraulic load on a pipe is the total load from,

(a) every *fixture* that is connected to the system upstream of the pipe,

(b) every *fixture* for which provision is made for future connection upstream of the pipe, and

(c) all roofs and paved surfaces that drain into the system upstream of the pipe.

7.4.10.2. Hydraulic Loads for Fixtures

(1) The hydraulic load from a *fixture* that is listed in Table 7.4.9.3. is the number of *fixture units* set forth in the Table.

(2) Except as provided in Sentence (1), the hydraulic load from a *fixture* that is not listed in Table 7.4.9.3. is the number of *fixture units* set forth in Table 7.4.10.2. for the *trap* of the *size* that serves the *fixture*.

Table 7.4.10.2.
Permitted Hydraulic Load from a Fixture Based on Size of Trap

Forming Part of Sentence 7.4.10.2.(2)

COLUMN 1	COLUMN 2
Size of *Trap*, in.	Hydraulic Load, *fixture units*
1 ¼	1
1 ½	2
2	3
2 ½	4
3	5
4	6

7.4.10.3. Hydraulic Loads from Fixtures with Continuous or Semi-continuous Flow

(1) Except as provided in Sentence (2), the hydraulic load from a *fixture* that produces a continuous flow, such as a pump or an air-conditioning *fixture*, is 31.7 *fixture units* for each litre per second of flow.

(2) Where a *fixture* or equipment that produces a continuous or semi-continuous flow drains to a *storm drainage system*, the hydraulic load from the *fixture* is 900 litres for each litre per second of flow.

(3) The hydraulic load from a *fixture* or equipment that produces a semi-continuous flow shall conform to Table 7.4.10.3.

Table 7.4.10.3.
Maximum Permitted Hydraulic Load from Fixtures with Semi-continuous Flows

Forming Part of Sentence 7.4.10.3.(3)

COLUMN 1	COLUMN 2	COLUMN 3
Maximum Permitted Flows by *Trap Size*		
Trap Size, in.	Flow, L/s	Hydraulic Load, *fixture units*
1 ½	0.00 - 0.090	3
2	0.091 - 0.190	6
3	0.191 - 0.850	27
4	0.851 - 5.700	180

7.4.10.4. Hydraulic Loads from Roofs or Paved Surfaces

(1) Except as provided in Sentence (2), the hydraulic load in litres from a roof or paved surface is the maximum 15 min rainfall determined in conformance with Supplementary Standard SB-1, multiplied by the sum of,

(a) the area in square metres of the horizontal projection of the surface drained, and

(b) one-half the area in square metres of the largest adjoining vertical surface.

(2) *Flow control roof drains* may be installed provided,

(a) the maximum drain down time does not exceed 24 h,

(b) the roof structure has been designed to carry the load of the accumulated water,

(c) one or more scuppers are installed so that the maximum depth of water on the roof cannot exceed 150 mm,

(d) they are located not more than 15 m from the edge of the roof and not more than 30 m from adjacent drains, and

(e) there is at least one drain for each 900 m^2.

7.4.10.5. Conversion of Fixture Units to Litres and Gal/min

(1) Except as provided in Sentence 7.4.10.3.(2), where the hydraulic load is to be expressed in litres, *fixture units* shall be converted as follows:

(a) when the number of *fixture units* is 260 or fewer, the load is 2 360 L, and

(b) when the number of *fixture units* exceeds 260, the load is 9.1 L for each *fixture unit*.

(2) Where the hydraulic load is to be expressed in gal/min, *fixture units* shall be converted in accordance with Table 7.4.10.5.

Table 7.4.10.5.
Maximum Probable Drainage Rate, gal/min

Forming Part of Sentences 7.4.10.3.(1), 7.4.10.5.(2)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
Fixture Units in Service	*Fixture Units*	*Fixture Units*	*Fixture Units*
	Col. 1	Col. 1 × 10	Col. 1 × 100
100	53	174	900
90	51	164	835
80	49	153	750
70	47	140	680
60	44	128	600
50	41	115	520
40	38	102	435
30	33	88	350
20	27	72	262
10	21	53	174

7.4.10.6. Hydraulic Loads to Soil or Waste Pipes

(1) Except as provided in Sentences (2) and (4), the hydraulic load that is drained to every *soil or waste stack* shall conform to Table 7.4.10.6.A.

Table 7.4.10.6.A.
Maximum Permitted Hydraulic Load Drained to Soil-or-Waste Stack

Forming Part of Sentence 7.4.10.6.(1)

COLUMN 1	COLUMN 2	COLUMN 3
Pipe *Size*, in.	Maximum Hydraulic Load, *fixture units*	Maximum *Fixture Units* Drained from any one *Storey*
1 ¼	2	2
1 ½	8	5
2	24	10
3	102	18
4	540	100
5	1 400	250
6	2 900	500
8	7 600	830

COLUMN 1	COLUMN 2	COLUMN 3
Pipe *Size*, in.	Maximum Hydraulic Load, *fixture units*	Maximum *Fixture Units* Drained from any one *Storey*
10	15 000	2 700
12	26 000	4 680
15	50 000	9 000

(2) Where the *norminally horizontal offset* in a *soil* or *waste stack* is 1 500 mm or more, the hydraulic load that is served by it shall conform to Table 7.4.10.8.

(3) Vertical *sanitary drainage pipe* shall be designed to carry no more than 29% of its full capacity.

(4) No vertical *waste pipe*, *branch* or *stack* of less than 3 in. diameter shall have a hydraulic load in excess of that permitted by Table 7.4.10.6.B.

Table 7.4.10.6.B.
Maximum Load on Vertical Drainage Pipe, Fixture Units

Forming Part of Sentence 7.4.10.6.(4)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
Pipe *Size*, in.	Stack Height 3 *Storeys* or less	Stack Height More than 3 *Storeys*	For Each *Storey* in Stack of more than 3 *Storeys*
1 ¼	2	2	2
1 ½	8	8	5
2	16	24	10

7.4.10.7. Hydraulic Loads on Branches

(1) No horizontal *sanitary drainage pipe* of less than 3 in. *size* shall have a *fixture* loading in excess of that permitted by Table 7.4.10.7.

Table 7.4.10.7.
Maximum Permitted Hydraulic Load Drained to a Branch

Forming Part of Sentence 7.4.10.7.(1)

COLUMN 1	COLUMN 2
Size of *Branch*, in.	Maximum Load, *fixture units*
1 ¼	2
1 ½	4
2	6

7.4.10.8. Hydraulic Loads on Sanitary Horizontal Drain

(1) Except as permitted by Article 7.4.10.7., the hydraulic load that is drained to a horizontal *sanitary drainage pipe* shall conform to Table 7.4.10.8., based on the *size* and slope.

(2) Horizontal *sanitary drainage pipe* shall be designed to carry no more than 65% of its full capacity.

Table 7.4.10.8.
Maximum Permitted Hydraulic Load Drained to a Horizontal Sanitary Drainage Pipe

Forming Part of Sentences 7.4.10.3.(1), 7.4.10.6.(2) and 7.4.10.8.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7
Drain *Size*, Nominal in.	Maximum Hydraulic Load, *fixture units*					
	Slope[(1)]					
	1:400	1:200	1:133	1:100	1:50	1:25
3	---	---	---	---	27	36
4	---	---	---	180	240	300
5	---	---	380	390	480	670
6	---	---	600	700	840	1300
8	---	1400	1500	1600	2250	3370
10	---	2500	2700	3000	4500	6500
12	2240	3900	4500	5400	8300	13000
15	4800	7000	9300	10400	16300	22500

Notes to Table 7.4.10.8.:

(1) Slope is the ratio of rise to run, in whatever measurement units are chosen.

7.4.10.9. Hydraulic Loads on Horizontal Storm Drains

(1) The hydraulic load that is drained to a horizontal *storm drainage pipe* shall conform to Table 7.4.10.9., based on the *size* and slope.

Table 7.4.10.9.
Minimum Permitted Hydraulic Load Drained to a Horizontal Storm Drainage Pipe

Forming Part of Sentences 7.4.10.9.(1) and 7.4.10.10.(2)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8
Size of Drain or Sewer, in.	Maximum Hydraulic Load, L						
	Slope[1]						
	1 in 400	1 in 200	1 in 133	1 in 100	1 in 68	1 in 50	1 in 25
3	------	------	------	------	2 390	2 770	3 910
4	------	------	------	4 220	5 160	5 970	8 430
5	------	------	6 760	7 650	9 350	10 800	15 300
6	------	------	10 700	12 400	15 200	17 600	24 900
8	------	18 900	23 200	26 700	32 800	37 800	53 600
10	------	34 300	41 900	48 500	59 400	68 600	97 000
12	37 400	55 900	68 300	78 700	96 500	112 000	158 000
15	71 400	101 000	124 000	143 000	175 000	202 000	287 000

Notes to Table 7.4.10.9.:

(1) Slope is the ratio of rise to run, in whatever measurement units are chosen.

7.4.10.10. Rain Leaders

(1) No change in the *size* of a rain *leader* with a *nominally horizontal offset* is required if the *offset*,

(a) is located immediately under the roof,

(b) is not more than 6 m long, and

(c) has a slope not less than 1 in 50.

(2) If the horizontal *offset* is more than 6 m long, the rain *leader* shall conform to Table 7.4.10.9.

(3) The hydraulic load that is drained to a rain *leader* shall conform to Table 7.4.10.10.

Table 7.4.10.10.
Maximum Permitted Hydraulic Load Drained to a Circular Rain Leader

Forming Part of Sentence 7.4.10.10.(3)

COLUMN 1	COLUMN 2
Size, in.	Maximum Hydraulic Load, L
2	1 700
2 ½	3 070
3	5 000
4	1 0800
5	19 500
6	31 800
8	68 300

Section 7.5. Venting Systems

7.5.1. Vent Pipes for Traps

7.5.1.1. Venting for Traps

(1) Except as provided in Sentences (3) and (4), every *trap* shall be protected by a *vent pipe*.

(2) *Drainage systems* shall be protected by the installation of a system as provided in Subsections 7.5.4. and 7.5.5. by the installation of,

(a) *additional circuit vents*,

(b) *branch vents*,

(c) *circuit vents*,

(d) *continuous vents*,

(e) *dual vents*,

(f) *fresh air inlets*,

(g) *headers*,

(h) *individual vents*,

(i) *offset relief vents*,

(j) *relief vents*,

(k) *stack vents*,

(l) *vent stacks*,

(m) *wet vents*, or

(n) *yoke vents*.

(3) A *trap* that serves a floor drain or *hub drain* need not be protected by a *vent pipe* separately where,

(a) the *size* of the *trap* is not less than 3 in.,

(b) the length of the *fixture drain* is not less than 450 mm,

(c) the fall on the *fixture drain* does not exceed its *size*, and

(d) the *trap* is connected to a horizontal drainage pipe that terminates at its upstream end in a 3 in. *stack*.

(4) A *trap* need not be protected by a *vent pipe*,

(a) where it serves,

  (i) a *subsoil drainage pipe*, or

  (ii) a *storm drainage system*, or

(b) where it forms part of an indirect *drainage system*.

7.5.2. Wet Venting

7.5.2.1. Wet Venting

(1) A *soil* or *waste pipe* may serve as a *wet vent* provided that,

(a) the hydraulic load is in accordance with Table 7.5.8.1.,

(b) the number of wet vented water closets does not exceed 2,

(c) when 2 water closets are installed, they are connected at the same level to a vertical part of the stack by means of a double fitting in accordance with Table 7.2.4.5.,

(d) the water closets are installed downstream of all other *fixtures*,

(e) *trap arms* and *fixture drains* connected to the *wet vent* do not exceed 2 in. in *size*, except for connections from floor drains in accordance with Sentence 7.5.1.1.(3),

(f) the total hydraulic load on the *wet vent* does not exceed the limits stated in Table 7.5.8.1. when separately vented *branches* or *fixture drains* in the same *storey*, having a total hydraulic load not greater than 2 *fixture units*, are connected to a *wet vent* or a wet vented water closet *trap arm*,

(g) the hydraulic load to be considered when sizing a *continuous vent*, that serves a *wet vent* only includes the hydraulic load that is wet vented,

(h) when a *wet vent* extends through more than one *storey*, the total discharge from any one *storey* above the *first storey* does not exceed 4 *fixture units*,

(i) there is not more than one *nominally horizontal offset* in the *wet vent*, and,

  (i) the *offset* does not exceed 1 200 mm for pipes 2 in. or less in *size*, or

  (ii) the *offset* does not exceed 2 500 mm for pipes larger than 2 in. in *size*,

(j) the wet vented portion is not reduced in *size* except for the portion that is upstream of floor drains in accordance with Sentence 7.5.1.1.(3), and

(k) the length of the *wet vent* is not limited.

7.5.3. Circuit Venting

7.5.3.1. Circuit Venting

(1) A section of a *horizontal branch* may be *circuit vented* provided,

(a) a *circuit vent* is connected to it,

(b) all *fixtures* serve by the *circuit vent* are located in the same *storey* and located at the most distant upstream section of the *horizontal branch*, and

(c) no *soil* or *waste stack* is connected to it upstream of a circuit vented *fixture*.

(2) *Fixtures* with *fixture outlet pipes* less than 2 in. in *size* shall be separately vented or separately circuit vented.

(3) Except as provided in Sentences (4) and (5), a *relief vent* shall be connected to the *branch* that forms part of a circuit vented system, downstream of the connection of the most downstream circuit vented *fixture*.

(4) A *soil* or *waste pipe* having a hydraulic load not greater than 6 *fixture units* may act as a *relief vent* for a *branch* that is being circuit vented.

(5) A symmetrically connected *relief vent* may serve as a combined *relief vent* for a maximum of 2 *branches* that are circuit vented, provided there are not more than 8 circuit vented *fixtures* connected between the combined *relief vent* and each *circuit vent*.

(6) Additional *circuit vents* shall be required,

(a) when each cumulative horizontal change in direction of a *branch* served by a *circuit vent* exceeds 45^0 between *vent pipe* connections, or

(b) where more than 8 circuit vented *fixtures* are connected to a *branch* between *vent pipe* connections.

(7) A *soil* or *waste pipe* may serve as an *additional circuit vent* in accordance with Sentence (6) provided that the *soil* or *waste pipe* is sized as a *wet vent* in conformance with Article 7.5.8.1. and is not less than 2 in. in *size*.

(8) Connections to *circuit vents* and *additional circuit vents* in accordance with Sentence (6) shall conform to Sentence 7.5.4.5.(1).

(9) A circuit vented *branch*, including the *fixture drain* downstream of the *circuit vent* connection, shall be sized in accordance with Articles 7.4.10.7. and 7.4.10.8., except that it shall be not less than,

(a) 2 in., where *traps* less than 2 in. in *size* are circuit vented, or

(b) 3 in., where *traps* 2 in. in *size* or larger are circuit vented.

(10) *Additional circuit vents* shall be sized in accordance with Table 7.5.7.1. and Sentence 7.5.7.3.(1).

(11) The hydraulic load on a *circuit vent* shall include the hydraulic load from *fixtures* connected to the *branch* served by the *circuit vent*, but shall not include the hydraulic load from *fixtures* permitted by Sentences (3), (4) and (5).

7.5.4. Vent Pipes for Soil or Waste Stacks

7.5.4.1. Stack Vents

(1) The upper end of every *soil* or *waste stack* shall terminate in a *stack vent* and the *stack vent* shall terminate in *open air* outside the *building*, or connect directly or through a *header* to another *stack vent* or *vent stack* that does terminate in *open air* outside the *building*.

7.5.4.2. Vent Stacks

(1) Except as provided in Sentence (2), every *soil* or *waste stack* greater than 4 *storeys* in height shall have a *vent stack*.

(2) A *soil* or *waste stack* that serves as a *wet vent* does not require a *vent stack*.

(3) The *vent stack* required by Sentence (1) shall be connected to a vertical section of the *soil* or *waste stack* at or immediately below the lowest *soil* or *waste pipe* connected to the *soil* or *waste stack*.

(4) *Fixtures* may be connected to a *vent stack* provided,

(a) the total hydraulic load of the connected *fixtures* does not exceed 8 *fixture units*,

(b) at least one *fixture* is connected to a vertical portion of the *vent stack* and upstream of any other *fixtures*,

(c) no other *fixture* is connected downstream of a water closet,

(d) all *fixtures* are located in the lowest *storey* served by the *vent stack*, and

(e) the section of the *vent pipe* that acts as a *wet vent* conforms to the requirements regarding *wet vents*.

7.5.4.3. Yoke Vents

(1) Except as provided in Sentence (4), where a *soil* or *waste stack* receives the discharge from *fixtures* located on more than 11 *storeys*, a *yoke vent* shall be,

(a) installed for each section of 5 *storeys* or part of them counted from the top down,

(b) installed at or immediately above each *offset* or double *offset*, and

(c) sized in accordance with Sentence 7.5.7.5.(1).

(2) The *yoke vent* shall be connected to the *soil* or *waste stack* by means of a drainage fitting at or immediately below the lowest *soil* or *waste pipe* from the lowest *storey* of the sections described in Sentence (1).

(3) The *yoke vent* shall connect to the *vent stack* at least 1 000 mm above the floor level of the lowest *storey* in the section described in Sentence (1).

(4) A *yoke vent* need not be installed provided the *soil* or *waste stack* is interconnected with the *vent stack* in each *storey* of the section in which *fixtures* are located by means of a *vent pipe* equal in *size* to the *branch* or *fixture drain* or 2 in. in *size*, whichever is smaller.

7.5.4.4. Offset Relief Vents

(1) A *soil* or *waste stack* that has a *nominally horizontal offset* more than 1 500 mm long and above which the upper vertical portion of the stack passes through more than 2 *storeys* and receives a hydraulic load of more than 100 *fixture units* shall be vented by an *offset relief vent* connected to the vertical section immediately above the *offset*, and by another *offset relief vent*,

(a) connected to the lower vertical section at or above the highest *soil* or *waste pipe* connection, or

(b) extended as a vertical continuation of the lower section.

7.5.4.5. Fixtures Draining into Vent Pipes

(1) The *trap arm* of a *fixture* that has a hydraulic load of not more than 1 ½ *fixture units* may be connected to the vertical section of a *circuit vent*, *additional circuit vent*, *offset relief vent*, *relief vent* or *yoke vent*, provided that,

(a) not more than 2 *fixtures* are connected to the *vent pipe*,

(b) where 2 *fixtures* are connected to the *vent pipe*, the connection is by means of a double sanitary T fitting, and

(c) the section of the *vent pipe* that acts as a *wet vent* conforms to the requirements regarding *wet vents*.

7.5.5. Miscellaneous Vent Pipes

7.5.5.1. Venting of Sanitary Sewage Sumps

(1) Every sump or tank that receives *sanitary sewage* shall be provided with a *vent pipe* that is connected to the top of the sump or tank.

7.5.5.2. Venting of Interceptors

(1) Every oil *interceptor* shall be provided with 2 *vent pipes* that,

(a) connect to the *interceptor* at opposite ends,

(b) extend independently to *open air*,

(c) terminate not less than 2 000 mm above ground and at elevations differing by at least 300 mm, and

(d) do not connect to each other or any other *vent pipe*.

(2) Adjacent compartments within every oil *interceptor* shall be connected to each other by a *vent* opening.

(3) Where a secondary receiver for oil is installed in conjunction with an oil *interceptor*, it shall be vented in accordance with the manufacturer's recommendations, and the *vent pipe* shall,

(a) in no case be less than 1 ½ inch in *size*,

(b) extend independently to *open air*, and

(c) terminate not less than 2 000 mm above ground.

(4) The *vent pipes* referred to in Sentence (1) are permitted to be one *size* smaller than the largest connected drainage pipe but not less than 1 ¼ in. in *size*, or can be sized in accordance with the manufacturer's recommendations.

(5) Every *vent pipe* that serves an oil or grease *interceptor* and is located outside a *building* shall be not less than 3 in. in *size* in areas where it may be subject to frost closure.

(6) Every grease *interceptor* shall have a *vent pipe* that is not less than 1 ½ in. *size* connected to the outlet pipe, that connects to the *plumbing venting system*.

(7) A *vent pipe* shall be provided within 1 500 mm of the inlet to a grease *interceptor* complete with a *cleanout* to provide cleaning of the *vent pipe*.

(8) Where an acid waste dilution tank is installed, it shall be provided with a *vent pipe* connected at the top of the tank and that is sized in accordance with Article 7.5.7.7.

7.5.5.3. Venting of Corrosive Drain Piping and Dilution Tanks

(1) *Venting systems* for drain piping or dilution tanks conveying corrosive waste shall extend independently and terminate in *open air*.

7.5.5.4. Fresh Air Inlets

(1) Where a *building trap* is installed, a *fresh air inlet* not less than 4 in. in *size* shall be connected upstream and within 1 200 mm of the *building trap* and downstream of any other connection.

7.5.5.5. Provision for Future Installations

(1) Where provision is made for a *fixture* to be installed in the future, the *drainage system* and *venting system* shall be sized accordingly and provision made for the necessary future connections.

(2) Except as required in Sentence 7.5.7.7.(2), where a *plumbing system* is installed in a *building*, every *storey* in which *plumbing* is or may be installed, including the basement of a single family dwelling, shall have extended into it or passing through it a *vent pipe* that is at least 1 ½ in. in *size* for the provision of future connections.

7.5.6. Arrangement of Vent Pipes

7.5.6.1. Drainage of Vent Pipes

(1) Every *vent pipe* shall be installed without depression in which moisture can collect.

(2) Every *waste pipe* shall be installed and *back vented* at the same time.

7.5.6.2. Vent Pipe Connections

(1) Every *vent pipe* in a *plumbing system* shall be installed so as to be direct as possible to a *vent stack* or *open air*, as the case may be, and so that any horizontal run below the flood level of the *fixture* to which the *vent pipe* is installed is eliminated where structurally possible.

(2) Except for *wet vents*, where a *vent pipe* is connected to a *nominally horizontal soil* or *waste pipe*, the connection shall be above the horizontal centre line of the *soil* or *waste pipe*.

(3) Unused *vent pipes* installed for future connections shall be permanently capped with an end *cleanout* or an adapter and plug.

7.5.6.3. Location of Vent Pipes

(1) Except as provided in Sentences (2) and (3), a *vent pipe* that protects a *fixture trap* shall be located so that,

(a) the *developed length* of the *trap arm* is not less than twice the *size* of the *fixture drain*,

(b) the total fall of the *trap arm* is not greater than its inside diameter, and

(c) the *trap arm* does not have a cumulative change in direction of more than 135°.

(2) The *trap arm* of water closets, S-*trap standards* or any other *fixture* that also discharges vertically and depends on siphonic action for its proper functioning shall not have a cumulative change in direction of more than 225°.

(3) A *vent pipe* that protects a water closet or any other *fixture* that also depends on siphonic action for its proper functioning shall be located so that the distance between the connections of the *fixture drain* to the *fixture* and the *vent pipe* shall not exceed,

(a) 1 000 mm in the vertical plane, and

(b) 3 m in the horizontal plane.

(4) The maximum length and minimum slope of every *trap arm* shall conform to Table 7.5.6.3.

Table 7.5.6.3.
Length of Trap Arm

Forming Part of Sentence 7.5.6.3.(4)

COLUMN 1	COLUMN 2	COLUMN 3
Size of *Trap* Served, in.	Maximum *Trap Arm*, m	Minimum Slope
1 ¼	1.5	1/50
1 ½	1.5	1/50
1	1.5	1/50
2	1.5	1/50
3	1.8	1/50
4	3	1/50
5	4	1/50
6	5	1/50

(5) The *vent pipe* from a water closet or any other *fixture* that has an integral siphonic flushing action may be connected to the *vertical leg* of its drainage pipe.

7.5.6.4. Connection of Vents above Fixtures Served

(1) Except for a *wet vent*, every *vent pipe* shall extend above the *flood level rim* of every *fixture* that it serves before being connected to another *vent pipe*.

(2) No *vent pipe* shall be connected in such a manner that a blockage in a *soil* or *waste pipe* would cause waste to drain through the *vent pipe* to the *drainage system*.

7.5.6.5. Terminals

(1) Except as provided in Sentence (3), the upper end of every *vent pipe* that is not terminated in *open air* shall be connected to a *venting system* that terminates through a roof to *open air*.

(2) The upper end of every *vent pipe* that is terminated in *open air*, other than a *vent pipe* that serves an oil *interceptor* or a *fresh air inlet*, shall be extended above the roof.

(3) Where a *vent pipe* is installed as a result of additions or alterations to a *plumbing system* in an existing *building*, the *vent pipe* may be erected outside the *building*, provided that,

(a) no single change of direction of the *vent pipe* exceeds 45°,

(b) all parts of the *vent pipe* are *nominally vertical*,

(c) the *vent pipe* is increased to not less than 3 in. in *size* before penetrating a wall or roof, and

(d) where the *building* is 4 *storeys* or less in height, the *vent pipe* terminates above the roof of the *building*.

(4) Except for a *fresh air inlet*, where a *vent pipe* is terminated in *open air*, the terminal shall be located,

(a) not less than 1 000 mm above or not less than 3.5 m in any other direction from every air inlet, openable window or door,

(b) not less than 2 000 mm above or not less than 3.5 m in any other direction from a roof that supports an *occupancy*, and

(c) not less than 2 000 mm above ground.

(5) Where a *vent pipe* passes through a roof, it shall,

(a) be terminated high enough to prevent the entry of roof drainage but not less than 150 mm above the roof or above the surface of storm water, which could pond on the roof, and

(b) be equipped with flashing to prevent the entry of water between the *vent pipe* and the roof or the wall.

(6) Where a *vent pipe* passes through a roof or an outside wall of a *building*, it shall be protected from frost closure by increasing its diameter at least one *size*, but not less than 3 in. in *size*, immediately before it penetrates the roof or the wall.

(7) Where a *vent pipe* is located 2 000 mm or more above a roof, it shall be so constructed as to be stable and secure.

(8) Flashing shall be of material specified in Article 7.2.10.14. and on a shingled roof shall have a minimum dimension of 500 mm by 500 mm.

(9) Where a sleeve flashing is installed on a flat roof it shall extend at least 150 mm above the flood level and on a sloped roof shall be at least 150 mm high on the short side.

(10) No bore of a *vent stack* or *stack vent* shall be reduced or obstructed by the installation of a flashing.

7.5.7. Minimum Size of Vent Pipes

7.5.7.1. General

(1) The *size* of every *vent pipe* shall conform to Table 7.5.7.1.

Table 7.5.7.1.
Minimum Permitted Size of Vent Pipe Based on Size of Trap

Forming Part of Sentence 7.5.7.1.(1)

COLUMN 1	COLUMN 2	COLUMN 3
Size of *Trap* Served, in.	Minimum *Size* of *Vent Pipe*, in.	Maximum *Trap Arm*, m
1 ¼	1 ¼	1.5
1 ½	1 ¼	1.5
2	1 ½	1.5
3	1 ½	1.8
4	1 ½	3.0
5	2	4.0
6	2	5.0

7.5.7.2. Size Restriction

(1) The *size* of a *branch vent*, *stack vent*, *vent stack* or *header* shall be not less than the *size* of the *vent pipe* to which it is connected.

(2) Every *sanitary building drain* shall terminate at its upstream end in a stack of at least 3 in. *size*.

(3) A stack referred to in Sentence (2) shall be a *soil stack* if one is available and may be a *vent stack* or *waste stack* that provides at least 3 in. *stack vent* and that goes to *open air* above the roof, either directly or through a *header*.

7.5.7.3. Additional Circuit Vents and Relief Vents

(1) Except as provided in Article 7.5.7.1. and in Sentence 7.5.3.1.(7), the minimum *size* of an *additional circuit vent* or *relief vent* installed in conjunction with a *circuit vent* is permitted to be one *size* smaller than the required *size* of the *circuit vent*, but need not be larger than 2 in.

(2) The *size* of the *soil* or *waste pipe* acting as a *relief vent* in accordance with Sentence 7.5.3.1.(4) shall be in conformance with Tables 7.5.8.3. or 7.5.8.4. or Article 7.5.7.1., whichever *size* is the largest considering the hydraulic load drained into the *soil* or *waste pipe*.

7.5.7.4. Offset Relief Vents

(1) Except as provided in Article 7.5.7.1., the minimum *size* of an *offset relief vent* is permitted to be one *size* smaller than the *size* of the *stack vent*.

7.5.7.5. Yoke Vents

(1) *Yoke vents* required by Sentence 7.5.4.3.(1) are permitted to be one *size* smaller than the *size* of the smallest pipe to which they are connected.

7.5.7.6. Vent Pipes for Manholes

(1) The minimum *size* of a *vent pipe* that serves a manhole within a *building* shall be 2 in.

7.5.7.7. Vents for Sanitary Sewage Sumps or Tanks, Dilution Tanks and Macerating Toilet Systems

(1) Except as provided in Sentences (2) and (3), the minimum *size* of the *vent pipe* for a *sanitary sewage* sump or tank, or dilution tank shall be one *size* smaller than the *size* of the largest *branch* or *fixture drain* draining to the sump or tank.

(2) The *size* of every *vent pipe* for a *sanitary sewage* sump or tank, or dilution tank shall be not less than 2 in., but need not be greater than 4 in.

(3) The *size* of every *vent pipe* for a macerating toilet system with a sump or tank shall be not less than 1 ½ in.

7.5.8. Sizing of Vent Pipes

7.5.8.1. Hydraulic Loads Draining to Wet Vents

(1) The hydraulic load that drains to a *wet vent* shall conform to Table 7.5.8.1.

(2) When determining the *size* of a *wet vent*, the hydraulic load from the most downstream *fixture* or symmetrically connected *fixtures* shall not be included.

Table 7.5.8.1.
Maximum Permitted Hydraulic Loads Drained to a Wet Vent

Forming Part of Articles 7.5.2.1. and 7.5.8.1.

COLUMN 1	2	3
Size of *Wet Vent*, in.	Maximum Hydraulic Load, *Fixture Units*	
	Not Serving Water Closets	Serving Not More Than Two Water Closets
		Fixtures Other Than Water Closets
1 ½	2	N/A
2	4	3
3	12	8
4	36	14
5	N/A	18
6	N/A	23

7.5.8.2. Individual Vents and Dual Vents

(1) The *size* of *individual vents* and *dual vents* shall be determined using Table 7.5.7.1. according to the largest *trap* served.

(2) When sizing an *individual vent* or a *dual vent*, the length is not taken into consideration.

7.5.8.3. Branch Vents, Headers, Continuous Vents and Circuit Vents

(1) *Branch vents*, *headers*, *circuit vents* and *continuous vents* shall be sized in accordance with Table 7.5.8.3.

Table 7.5.8.3.
Sizing of Branch Vents, Headers, Continuous Vents and Circuit Vents

Forming Part of Article 7.5.8.3.

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9
Total Hydraulic Load Served by Vent, *fixture units*	Size of *Vent Pipe*, in.							
	1 ¼	1 ½	2	3	4	5	6	8
	Maximum Length of *Vent Pipe*, m							
2	9							
8	9	30	61					
20	7.5	15	46					
24	4.5	9	30					
42		9	30					
60		4.5	15	120				
100			11	79	305			
200			9	76	275			
500			6	55	215			
1 100				15	61	215		
1 900				6	21	61	215	
2 200					9	27	105	335
3 600					7.5	18	76	245
5 600						7.5	18	76

(2) For the purposes of Table 7.5.8.3., the length of a *branch vent* shall be its *developed length* from the most distant *soil* or *waste pipe* connection to a *vent stack*, *stack vent*, *header* or *open air*.

(3) For the purposes of Table 7.5.8.3., the length of a *header* shall be its *developed length* from the most distant *soil* or *waste pipe* connection to *open air*.

(4) For the purposes of Table 7.5.8.3., the length of a *circuit vent* shall be its *developed length* from the horizontal *soil* or *waste pipe* connection to a *vent stack*, *stack vent*, *header* or *open air*.

(5) For the purposes of Table 7.5.8.3., the length of a *continuous vent* shall be its *developed length* from the vertical *soil* or *waste pipe* connection to a *vent stack*, *stack vent*, *header* or *open air*.

7.5.8.4. Vent Stacks, or Stack Vents

(1) A *vent stack*, or *stack vent* shall be sized in accordance with Table 7.5.8.4. based on,

(a) the length of the *vent stack* or *stack vent*, and

(b) the total hydraulic load that is drained to the lowest section of *soil* or *waste stack* or stacks served by the *vent pipe*, plus any additional vent loads connected to the *vent stack* or *stack vent*.

(2) For the purposes of Table 7.5.8.4., the length of a *stack vent* or *vent stack* shall be its *developed length* from its lower end to *open air*.

(3) The minimum *size* of *vent stack* or *stack vent* shall be one-half the *size* of the *soil* or *waste stack* at its base.

(4) A *stack vent* serving a *wet vent* stack that is over 4 *storeys* high shall extend the full *size* of the *wet vent* to *open air*.

(5) Every *sanitary building drain* shall be provided with at least one *vent* that is not less than 3 in. in *size*.

Table 7.5.8.4.
Size and Developed Length of Stack Vents and Vent Stacks

Forming Part of Article 7.5.8.4.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9	COLUMN 10	COLUMN 11	COLUMN 12
Size of *Soil* or *Waste Stack*, in.	Total Hydraulic Load Being Vented, *fixture units*	Water Occupied Area	*Size* of *Stack Vent* or *Vent Stack*, in.								
			1 ½	2	3	4	5	6	8	10	12
			Maximum Length of *Stack Vent* or *Vent Stack*, m								
3	10	0.15	13	46	317	Not Limited					
	21	.20	10	33.5	247						
	53	.25	8	28.5	207						
	102	.29	7.5	26	189						
4	43	0.15	Not Permitted	10.5	76	299	Not Limited				
	140	.20		8	61	229					
	320	.25		7	52	195					
	540	.29		6.5	46	177					
5	190	0.15	Not Permitted		25	97.5	302	Not Limited			
	490	.20			29	76	232				
	940	.25			16	64	204				
	1 400	.29			15	58	180				
6	500	0.15	Not Permitted		10	39.5	122	305	Not Limited		
	1 100	.20			8	30.5	94.5	238			
	2 000	.25			6.5	25.5	79	201			
	2 900	.29			6	23.5	73	183			
8	1 800	0.15	Not Permitted			9.5	29	73	287	Not Limited	
	3 400	.20				7	22	58	219.5		
	5 600	.25				6	19	49	186		
	7 600	.29				5.5	17	43	70.5		
10	4 000	0.15	Not Permitted				9.5	24	94.5	292.5	Not Limited
	7 200	.20					7	18	73	225.5	
	11 000	.25					6	15.5	61	192	
	15 000	.29					5.5	14	55	174	
12	7 300	0.15	Not Permitted					9.5	36.5	116	287
	13 000	.20						7	28.5	91	219.5
	20 000	.25						6	24	76	186
	26 000	.29						5.5	22	70	152
15	15 000	0.15	Not Permitted						12	39.5	94.5
	25 000	.20							9.5	29	73
	38 000	.25							8	24.5	62
	50 000	.29							7	22.5	55

7.5.8.5. Lengths for other Vent Pipes

(1) When sizing an *additional circuit vent*, *offset relief vent*, *relief vent*, *yoke vent* and the *vent pipe* for an *interceptor*, dilution tank, *sanitary sewage* tank or sump, or manhole, length is not taken into consideration.

7.5.9. Air Admittance Valves

7.5.9.1. Air Admittance Valve as a Vent Terminal

(1) *Individual vents* may terminate with a connection to an *air admittance valve* as provided in Articles 7.5.9.2. and 7.5.9.3.

7.5.9.2. Air Admittance Valves

(1) *Air admittance valves* shall only be used to vent,

(a) *fixtures* in *buildings* undergoing renovation, and

(b) installations where connection to a *vent* may not be practical.

(2) The *air admittance valves* shall be located,

(a) above the *flood level rim* of the *fixture* it serves,

(b) within the maximum *developed length* permitted for the *vent*,

(c) not less than 150 mm above insulation materials, and

(d) installed in a location not subject to back pressure.

(3) Air admittance valves shall,

(a) only vent *fixtures* located on the same *storey*, and

(b) be connected to the horizontal *fixture drain*.

7.5.9.3. Installation Conditions

(1) *Air admittance valves* shall not be installed in supply or return air plenums, or in locations where they may be exposed to freezing temperatures.

(2) *Air admittance valves* shall be installed in accordance with the manufacturer's installation instructions.

(3) *Air admittance valves* shall be rated for the *size* of *vent pipe* to which they are connected.

(4) Installed *air admittance valves* shall be,

(a) *accessible*, and

(b) located in a space that allows air to enter the valve.

(5) Every *drainage system* shall have one *vent* that terminates to *open air* in conformance with Sentence 7.5.6.2.(1).

Section 7.6. Potable Water Systems

7.6.1. Arrangement of Piping

7.6.1.1. Design, Fabrication and Installation

(1) *Potable water systems* shall be designed, fabricated and installed in accordance with good engineering practice, such as that described in the ASHRAE Guide and Data Books, the ASHRAE Handbooks and ASPE Data Books.

(2) Every *fixture* supplied with separate hot and cold water controls shall have the hot water control on the left and the cold on the right.

(3) Where hot and cold water are mixed and the temperature is regulated by a single, unmarked, manual control, a movement to the left shall increase the temperature and a movement to the right shall decrease the temperature.

(4) In a hot *water distribution system* of a *developed length* of more than 30 m or supplying more than 4 *storeys*, the water temperature shall be maintained by,

(a) recirculation, or

(b) a self-regulating heat tracing system.

7.6.1.2. Drainage

(1) A *water distribution system* shall be installed so that the system can be drained or blown out with air and outlets for this purpose shall be provided.

7.6.1.3. Control and Shut-off Valves

(1) A *building control valve* shall be provided,

(a) on every *water service pipe* at the location where the *water service pipe* enters the *building*, or

(b) on the *water distribution system* at a location immediately downstream of the *point of entry treatment unit*, where the *building* is served by a *point of entry treatment unit* located in the *building*.

(2) Except as provided in Sentence (3), a drain port shall be provided on the *water distribution system* immediately downstream of the *building control valve* required by Sentence (1) and if there is a meter, the drain port shall be installed immediately downstream of the meter on the *water distribution system*.

(3) Where the *building control valve* required by Sentence (1) is of one in. trade *size* or smaller, the drain port may be an integral part of the *building control valve* in the form of a stop and waste valve and the drain port shall be located on the *water distribution system* side of the stop and waste valve.

(4) Every pipe that is supplied with water from a tank on the property that is a gravity water tank or a tank of a *drinking-water system* shall be provided with a shut-off valve located close to the tank.

(5) Where the water supply is to be metered, the installation of the meter, including the piping that is part of the meter installation and the valving arrangement for the meter installation, shall be according to the *water purveyor's* requirements.

(6) For the purpose of identifying the pipe material where plastic (polybutylene, polyethylene or PVC) water pipe is used underground for a service pipe, the end of the pipe inside the *building* shall be brought above ground for a distance not less than 300 mm and not greater than 450 mm.

7.6.1.4. Shut-off Valves

(1) Except for a single-family dwelling, every *riser* shall be provided with a shut-off valve at the source of supply.

7.6.1.5. Water Closets

(1) Every water closet shall be provided with a shut-off valve on its water supply pipe.

7.6.1.6. Suites

(1) Shut-off valves shall be installed in every *suite* in a *building* of *residential occupancy* as may be necessary to ensure that when the supply to one *suite* is shut off the supply to the remainder of the *building* is not interrupted.

7.6.1.7. Public Washrooms

(1) The water supply to each *fixture* in a washroom for *public use* shall be individually valved and each valve shall be *accessible*.

7.6.1.8. Tanks

(1) Every water pipe that supplies a hot water tank, pressure vessel, *plumbing appliance* or water using device shall be provided with a shut-off valve located close to the tank, pressure vessel, *plumbing appliance* or water using device.

7.6.1.9. Protection for Exterior Water Supply

(1) Every pipe that passes through an exterior wall to supply water to the exterior of the *building* shall be provided with,

(a) a frost-proof hydrant with a separate shut-off valve located inside the *building*, or

(b) a stop-and-waste cock located inside the *building* and close to the wall.

7.6.1.10. Check Valves

(1) A *check valve* shall be installed at the *building* end of the *water service pipe* where the pipe is made of plastic that is suitable for cold water use only.

7.6.1.11. Flushing Devices

(1) Every flushing device that serves a water closet or one or more urinals shall have sufficient capacity and be adjusted to deliver at each operation a volume of water that will thoroughly flush the *fixture* or *fixtures* that it serves.

(2) Where a manually operated flushing device is installed it shall serve only one *fixture*.

7.6.1.12. Relief Valves

(1) Every pressure vessel that is part of a *plumbing system* or connected to a *plumbing system* shall be equipped with a pressure relief valve designed to open when the water pressure in the tank reaches the rated working pressure of the tank, and so located that the pressure in the tank shall not exceed 1100 kPa or ½ the maximum test pressure sustained by the tank whichever is the lesser.

(2) Every hot water tank of a *storage-type service water heater* shall be equipped with a temperature relief valve with a temperature sensing element,

(a) located within the top 150 mm of the tank, and

(b) designed to open and discharge sufficient water from the tank to keep the temperature of the water in the tank from exceeding 99°C under all operating conditions.

(3) A pressure relief valve and temperature relief valve may be combined where Sentences (1) and (2) are complied with.

(4) Every *indirect service water heater* shall be equipped with,

(a) a pressure relief valve, and

(b) a temperature relief valve on every storage tank that forms part of the system.

(5) Every pipe that conveys water from a temperature relief, pressure relief, or a combined temperature and pressure relief valve shall,

(a) be of a *size* at least equal to the *size* of the outlet of the valve,

(b) be rigid, slope downward from the valve, and ,

  (i) terminate with an indirect connection above a floor drain, sump or other safe location, with an *air break* of not more than 300 mm, or

  (ii) terminate at a distance not less than 150 mm and not more than 300 mm from a floor and discharges vertically down,

(c) have no thread at its outlet, and

(d) be capable of operating at a temperature of not less than 99°C.

(6) The temperature relief valve required in Clause (4)(b) shall,

(a) have a temperature sensing element located within the top 150 mm of the tank, and

(b) be designed to open and discharge sufficient water to keep the temperature of the water in the tank from exceeding 99°C under all operating conditions.

(7) No shut-off valve shall be installed on the pipe between any tank and the relief valves or on the discharge lines from such relief valves.

7.6.1.13. Solar Domestic Hot Water Systems

(1) Except as provided in Sentence (2), a system for solar heating of *potable* water shall be installed in accordance with good engineering practice.

(2) Packaged systems for solar heating of *potable* water in *residential occupancies* shall be installed in conformance with CAN/CSA-F383, "Installation Code for Solar Domestic Hot Water Systems".

7.6.1.14. Water Hammer

(1) Provision shall be made to protect the *water distribution system* from the adverse effects of water hammer.

7.6.1.15. Mobile Home Water Service

(1) A *water service pipe* intended to serve a mobile home shall,

(a) be not less than ¾ in. *size*,

(b) be terminated above ground, and

(c) be provided with,

  (i) a tamperproof terminal connection that is capable of being repeatedly connected, disconnected and sealed,

  (ii) a protective concrete pad,

  (iii) a means to protect it from frost heave, and

  (iv) a curb stop and a means of draining that part of the pipe located above the frost line when not in use.

7.6.1.16. Thermal Expansion

(1) Protection against thermal expansion shall be required when a *check valve* is required by Article 7.6.1.10., a *backflow preventer* is required by Article 7.6.2.2., or a pressure reducing valve is required by Article 7.6.3.3.

7.6.2. Protection from Contamination

7.6.2.1. Connection of Systems

(1) Connections to *potable water systems* shall be designed and installed so that non-*potable* water or substances that may render the water non-*potable* cannot enter the system.

(2) No connection shall be made between a *potable water system* supplied with water from a *drinking-water system* and any other *potable water system* without the consent of the *water purveyor*.

7.6.2.2. Back Siphonage

(1) Every *potable water system* that supplies a *fixture* or tank that is not subject to pressures above atmospheric shall be protected against *back-siphonage* by a *backflow preventer*.

(2) Where a *potable* water supply is connected to a boiler, tank, cooling jacket, lawn sprinkler system or other device where a non-*potable* fluid may be under pressure that is above atmospheric or the water outlet may be submerged in the non-*potable* fluid, the water supply shall be protected against *backflow* by a *backflow preventer*.

(3) Where a hose bibb is installed outside a *building*, inside a garage, or where there is an identifiable risk of contamination, the *potable water system* shall be protected against *backflow* by a *backflow preventer*.

7.6.2.3. Reserved

7.6.2.4. Backflow from Fire Protection Systems

(1) A *backflow preventer* shall not be required in a *residential full flow through fire sprinkler system*, in which the pipe and fittings are constructed of *potable water system* materials.

(2) Except as required in Sentence (4), *potable water system* connections to fire sprinkler and standpipe systems shall be protected against *backflow* caused by *back-siphonage* or *back pressure* in conformance with the following Clauses:

(a) *Residential partial flow through fire sprinkler systems* in which the pipes and fittings are constructed of *potable water system* materials shall be protected by a dual *check valve backflow preventer* conforming to CAN/CSA-B64.6.1, "Backflow Preventers, Dual Check Valve Type for Fire Systems (DuCF)",

(b) *Class 1 fire sprinkler/standpipe systems* shall be protected by a single *check valve backflow preventer* conforming to CAN/CSA-B64.9, "Backflow Preventers, Single Check Valve Type for Fire Systems (SCVAF)", provided that the systems do not use antifreeze or other additives of any kind and all pipes and fittings are constructed of *potable water system* materials,

(c) *Class 1 fire sprinkler/standpipe systems* not covered by Clause (b) as well as *Class 2* and *Class 3 fire sprinkler/standpipe systems* shall be protected by a double *check valve backflow preventer* conforming to CAN/CSA-B64.5.1, "Backflow Preventers, Double Check Valve Type for Fire Systems (DCVAF)", provided that the systems do not use antifreeze or other additives of any kind,

(d) *Class 1, Class 2* or *Class 3 fire sprinkler/standpipe systems*, in which antifreeze or other additives are used shall be protected by a reduced pressure principle *backflow preventer* conforming to CAN/CSA-B64.4.1, "Backflow Preventers, Reduced Pressure Principle Type for Fire Systems (RPF)", installed on the portion of the system that uses the additives and the balance of the system shall be protected as required by Clauses (b) or (c),

(e) *Class 4* and *5 fire sprinkler/standpipe systems* shall be protected by a reduced pressure principle *backflow preventer* conforming to CAN/CSA-B64.4.1, "Backflow Preventers, Reduced Pressure Principle Type for Fire Systems (RPF)",

(f) *Class 6 fire sprinkler/standpipe systems* shall be protected,

  (i) by a double *check valve backflow preventer* conforming to CAN/CSA-B64.5.1, "Backflow Preventers, Double Check Valve Type for Fire Systems (DCVAF)", or

  (ii) where a potentially severe health hazard may be caused by *backflow*, by a reduced pressure principle *backflow preventer* conforming to CAN/CSA- B64.4.1, "Backflow Preventers, Reduced Pressure Principle Type for Fire Systems (RPF)", and

(g) backflow prevention devices on fire sprinkler and standpipe systems shall be selected and installed in conformance with Table 7.6.2.4.

Table 7.6.2.4.
Backflow Prevention Devices on Fire Sprinkler and Standpipe Systems

Forming Part of Sentences 7.6.2.4.(2)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6
CSA Standard Number	Type of Device(1)	System Made with Potable Water System Materials		System Not Made with Potable Water System Materials	
		Minor Hazard(2) Residential Partial Flow-Through System	Minor Hazard(2) Class 1 System	Moderate Hazard(2) Class 1, 2, 3 and 6 Systems	Severe Hazard(2) – Any Class of System in which Antifreeze or Other Additives Are Used
B64.6.1	DuCF	P	NP	NP	NP
B64.9	SCVAF	P	P	NP	NP
B64.5.1	DCVAF	P	P	P	NP
B64.4.1	RPF	P	P	P	P

Notes to Table 7.6.2.4.:

P – Permitted

NP – Not Permitted

(1) The product is only permitted for use on fire sprinkler and standpipe systems.

(2) Minor Hazard, Moderate Hazard and Severe Hazard have the same meaning as indicated in CAN/CSA-B64.10 "Manual for the Selection and Installation of Backflow Prevention Devices".

(3) The *backflow preventer* required by Sentence (2) shall be installed upstream of the fire department pumper connection.

(4) Where a reduced pressure principle *backflow preventer* is required on the *water service pipe* at a service connection located on the same premises as the *fire service main* in *Class 3, 4, 5* and *6 fire sprinkler/standpipe systems*, a reduced pressure principle *backflow preventer* conforming to CAN/CSA-B64.4.1, "Backflow Preventers, Reduced Pressure Principle Type for Fire Systems (RPF)", shall also be provided on the fire service connection.

(5) Except as permitted in Sentences (1) and (8), *backflow preventers* shall be selected, installed and tested in conformance with CAN/CSA-B64.10 "Manual for the Selection and Installation of Backflow Prevention Devices".

(6) *Backflow* prevention devices shall be provided in conformance with Sentence 7.2.10.10.(1).

(7) Tank type water closet valves shall be provided with a *back-siphonage preventer* in conformance with Sentence 7.2.10.10.(2).

(8) *Buildings* of *residential occupancy* within the scope of Part 9 are not required to be isolated unless they have access to an *auxiliary water supply*.

(9) In addition to the *backflow preventer* required by this Subsection, for *buildings* or facilities where a potentially severe health hazard may be caused by *backflow*, the *potable water system* shall be provided with premise isolation by the installation of a reduced pressure principle *backflow preventer*.

7.6.2.5. Reserved

7.6.2.6. Reserved

7.6.2.7. Reserved

7.6.2.8. Cleaning of Systems

(1) A newly installed part of a *potable water system* shall be cleaned and then flushed with *potable* water before the system is put into operation.

7.6.2.9. Air Gap

(1) An *air gap* shall not be located in a noxious environment.

(2) Every *air gap* shall be not less than 25 mm high and at least twice the diameter of the opening of the water supply outlet in height.

7.6.2.10. Vacuum Breakers and Flood Levels

(1) Where the *critical level* is not marked on an atmospheric *vacuum breaker* or pressure *vacuum breaker*, the *critical level* shall be taken as the lowest point on the device.

(2) Where an atmospheric *vacuum breaker* is installed, it shall be located on the downstream side of the *fixture* control valve or faucet so that it will be subject to water supply pressure,

(a) only when the *fixture* control valve or faucet is open, and

(b) for periods of use not to exceed 12 h continuous.

(3) An atmospheric *vacuum breaker* shall be installed so that the *critical level* is at least the distance specified by the manufacturer at which the device will operate safely but not less than 25 mm above,

(a) the *flood level rim* of a *fixture* or tank, or

(b) the highest point open to atmosphere in an irrigation system.

(4) A pressure *vacuum breaker* shall be installed with its *critical level* at least 300 mm above,

(a) the *flood level rim* of a *fixture* or tank, or

(b) the highest point open to atmosphere in an irrigation system.

7.6.3. Size and Capacity of Pipes

7.6.3.1. Design

(1) Except as permitted in Sentences (2) and (3), the *size* of every pipe in a *water distribution system* that supplies water to a *fixture* or device and the flow pressures at the supply openings shall be designed to provide peak demand flow in conformance to Table 7.6.3.1.

(2) A tail piece or connector not more than 750 mm long and not less than ¼ in. inside diameter may be used to supply water to a *fixture* or device.

(3) A *water distribution system* that serves not more than a single *dwelling unit* does not need to conform to Column 3 of Table 7.6.3.1.

(4) No *water system* between the point of connection with the *water service pipe* or the water meter and the first branch that supplies a water heater, shall be less than ¾ in. *size*.

(5) Every pipe that supplies a *fixture* shall have a capacity that will produce a flow in the *fixture* that will flush the *fixture* and keep it in a sanitary condition.

Table 7.6.3.1.
Pipe Sizing for Water Supply to Fixture/Device

Forming Part of Sentences 7.6.3.1.(1) and (3)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5
Fixture or Device	Minimum *Size* of Supply Pipe, in.	Minimum Flow Pressure(1) kPa (gauge)	Hydraulic Load, *fixture units*	
			Private Use	*Public Use*
Bathroom group				
(a) with flush tank	NA	NA	6	-
(b) with direct flush valve	NA	NA	8	-
Bath tub (with or without shower)	½	50	2	4
Clothes washer	½	100	3	-
Cup Sink	½	50	-	4
Dishwasher, domestic	½	100	3	-
Drinking fountain	3/8	100	-	1
Hose bib or wall hydrant	½	100	(2)	(2)
Laundry tray: 1, 2 or 3 compartments	½	100	2	4
Lavatory	3/8	50	1	2
Shower, single head	½	50	2	4
Sink				
(a) kitchen, domestic	½	50	2	-
(b) kitchen, commercial	½	50	-	4
(c) service, slop	½	50	-	3
(d) service with direct flush valve	¾	100	-	5
Urinal				
(a) with flush tank	½	50	-	3
(b) with direct flush valve	¾	100	-	5
(c) with self closing metering valve	½	-	-	-
Water closet				
(a) with flush tank	3/8	50	3	5
(b) with direct flush valve	1	100	6	10

Notes to Table 7.6.3.1.:

(1) Measured immediately upstream of faucet or supply valve.

(2) A continuous load of 0.38 L/s.

7.6.3.2. Hydraulic Load

(1) Except as provided in Sentence (3), the hydraulic load of a *fixture* or device that is listed in Table 7.6.3.1. shall be the number of *fixture units* given in the Table.

(2) Except as provided in Sentences (1) and (3), the hydraulic load of a *fixture* that is not listed in Table 7.6.3.1. is the number of *fixture units* listed in Table 7.6.3.2.

(3) Where *fixtures* are supplied with both hot and cold water, the hydraulic loads for maximum separate demands shall be 75% of the hydraulic load of the *fixture units* given in Tables 7.6.3.1. and 7.6.3.2. when using a detailed engineering design method.

Table 7.6.3.2.
Hydraulic Loads of Fixtures Not Listed in Table 7.6.3.1.

Forming Part of Sentences 7.6.3.2.(2) and (3)

COLUMN 1	COLUMN 2	COLUMN 3
Size of Supply Pipe, in.	Hydraulic Load, *fixture units*	
	Private Use	*Public Use*
3/8	1	2
½	2	4
¾	3	6
1	6	10

7.6.3.3. Static Pressure

(1) Where the static pressure at any *fixture* may exceed 550 kPa, a pressure reducing valve conforming to Article 7.2.10.12. shall be installed to limit the maximum static pressure at the *fixture* to 550 kPa.

7.6.3.4. Size

(1) Every *water service pipe* shall be sized according to the peak demand flow but shall not be less than ¾ in. *size*.

7.6.4. Water Efficiency

7.6.4.1. Water Supply Fittings

(1) The flow rates of fittings that supply water to a *fixture* shall not exceed the maximum flow rates at the test pressures listed for that fitting in Table 7.6.4.1.

Table 7.6.4.1.
Maximum Flow Rates for Water Supply Fittings

Forming Part of Sentence 7.6.4.1.(1)

COLUMN 1	COLUMN 2	COLUMN 3
Fitting	Maximum Flow, L/min	Test Pressure, kPa
Lavatory Faucet	8.35	413
Kitchen Faucet	8.35	413
Shower Heads	9.5	550

(2) Sentence (1) does not apply to a *fixture* located in a *heritage building*.

7.6.4.2. Plumbing Fixtures

(1) Water closets and urinals shall be certified to CAN/CSA-B45.0, "General Requirements for Plumbing Fixtures".

(2) The flush cycle for each *fixture* that is a water closet or urinal and that is installed as a replacement for a *fixture* in a *building* that existed before the 1st day of January 1996 shall not exceed the maximum flush cycle listed for that *fixture* in Table 7.6.4.2.A.

Table 7.6.4.2.A.
Maximum Flush Cycles for Sanitary Fixtures

Forming Part of Sentences 7.6.4.2.(2)

COLUMN 1	COLUMN 2
Fixture	litres
Water Closet (Tank Type)	13.25
Water Closet (Direct Flush)	13.25
Urinal (Tank Type)	5.68(1)
Urinal (Direct Flush)	5.68(1)

Notes to Table 7.6.4.2.A.:

(1) Urinals equipped with automatic flushing devices shall be controlled to prevent unnecessary flush cycles during *building* down time.

(3) Except as provided in Sentence (2) the flush cycle for each *fixture* that is a water closet or urinal shall not exceed the maximum flush cycle listed for that *fixture* in Table 7.6.4.2.B.

Table 7.6.4.2.B.
Maximum Flush Cycles for Sanitary Fixtures

Forming Part of Sentence 7.6.4.2.(3)

COLUMN 1	COLUMN 2
Fixture	litres
Water Closet (Tank Type)	6
Water Closet (Direct Flush)	6
Urinal (Tank Type)	3.8(1)
Urinal (Direct Flush)	3.8(1)

Notes to Table 7.6.4.2.B.:

(1) Urinals equipped with automatic flushing devices shall be controlled to prevent unnecessary flush cycles during *building* down time.

(4) Sentences (2) and (3) do not apply to a *fixture* located in a *heritage building*, *care or detention occupancy* or passenger station.

7.6.5. Water Temperature Control

7.6.5.1. Maximum Temperature of Hot Water

(1) Except as provided in Sentences (2) and 7.6.5.3.(1), the maximum temperature of hot water supplied by fittings to *fixtures* in a *residential occupancy* shall not exceed 49°C.

(2) Sentence (1) does not apply to hot water supplied to installed dishwashers or clothes washers.

7.6.5.2. Showers

(1) Except as provided for in Sentence (2) and (3), all valves supplying fixed location shower heads, shall be individually pressure-balanced or thermostatic-mixing valves, conforming to CAN/CSA-B125, "Plumbing Fittings".

(2) An individually pressure-balanced or thermostatic-mixing valve shall not be required for showers if a single temperature water supply for such showers is controlled by a master thermostatic-mixing valve conforming to CAN/CSA-B125, "Plumbing Fittings".

(3) Deck-mounted, hand-held, flexible-hose spray attachments are exempt from the thermal shock requirements of Sentence (1).

(4) Pressure-balanced or thermostatic-mixing valves shall be,

(a) designed so that the outlet temperature does not exceed 49°C, or

(b) equipped with high-limit stops which shall be adjusted to a maximum hot water setting of 49°C.

7.6.5.3. Temperature Control Devices

(1) A *water distribution system* supplying hot water to any bathtub, shower or hand basin that is accessible to a patient or resident in a Group B, Division 2 or 3 occupancy or a resident of a group home, *home for special care* or residence for developmentally-handicapped adults shall have one or more temperature gauges and control devices that are,

(a) accessible only to supervisory staff, and

(b) capable of being adjusted to ensure that the temperature of the water supplied to the *fixtures* does not exceed 49°C.

Section 7.7. Non-Potable Water Systems

7.7.1. Connection

7.7.1.1. Non-Potable Connection

(1) A non-*potable water system* shall not be connected to a *potable water system*.

7.7.2. Identification

7.7.2.1. Markings Required

(1) Non-*potable* water piping shall be identified by markings that are permanent, distinct and easily recognized.

7.7.3. Location

7.7.3.1. Pipes

(1) Non-*potable* water piping shall not be located,

(a) where food is prepared in a food processing plant,

(b) above food-handling equipment,

(c) above a non-pressurized *potable* water tank, or

(d) above a cover of a pressurized *potable* water tank.

7.7.3.2. Outlets

(1) An outlet from a non-*potable water system* shall not be located where it can discharge into,

(a) a sink or lavatory,

(b) a *fixture* into which an outlet from a *potable water system* is discharged, or

(c) a *fixture* that is used for a purpose related to the preparation, handling or dispensing of food, drink or products that are intended for human consumption.

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PART 8
SEWAGE SYSTEMS

Section 8.1. General

8.1.1. Scope

8.1.1.1. Scope

(1) The scope of this Part shall be as described in Subsection 1.1.2. of Division A and applies to the design, *construction*, operation, and maintenance of *sewage systems*.

8.1.1.2. Definitions

(1) In this Part,

Soil means in-situ, naturally occurring, unconsolidated mineral or organic material, at the earth's surface that is at least 100 mm thick and capable of supporting plant growth, and includes material compacted or cemented by soil forming processes, but does not include displaced materials such as gravel dumps, mine spoils, or like deposits.

8.1.2. Application

8.1.2.1. Classification of Systems

(1) All *sewage systems* shall be classed as one of the following:

(a) Class 1 — a chemical toilet, an incinerating toilet, a recirculating toilet, a self-contained portable toilet and all forms of privy including a *portable privy*, an *earth pit privy*, a *pail privy*, a *privy vault* and a composting toilet system,

(b) Class 2 — a *greywater* system,

(c) Class 3 — a cesspool,

(d) Class 4 — a *leaching bed* system, or

(e) Class 5 — a system that requires or uses a *holding tank* for the retention of *hauled sewage* at the site where it is produced prior to its collection by a *hauled sewage system*.

8.1.2.2. Operation and Maintenance

(1) Operation and maintenance of *sewage systems* shall comply with Section 8.9.

8.1.3. Limitations

8.1.3.1. Discharge

(1) Except as provided in Sentences (2) to (6) the *sewage system* shall be designed and *constructed* to receive only *sanitary sewage* of domestic origin.

(2) Where laundry waste is not more than 20% of the total daily design *sanitary sewage* flow, it may discharge to a *sewage system*.

(3) Where industrial process waste water is treated to the contaminant levels found in domestic *sanitary sewage* it may discharge to a *leaching bed* provided the *treatment unit* and *sewage system* are designed in accordance with good engineering practice.

(4) Where all kitchen waste water from a restaurant has passed through an operating grease interceptor, it may discharge to a *leaching bed system* provided the *sewage system* has been designed in accordance with good engineering practice.

(5) Waste water from a kitchen equipped with a garbage grinder may be directed to the *sewage system* provided the system has been designed to accept such waste water.

(6) Water softener and iron filter discharge may be directed to the *sewage system* provided the system has been designed to accept such discharges.

(7) *Storm sewage* shall not be discharged into a *sewage system*.

(8) The interceptor required in Sentence (4) shall have a minimum flow rate as required by Sentence 7.4.4.3.(8) using a 60 second drain down time.

8.2. Design Standards

8.2.1. General Requirements

8.2.1.1. Scope

(1) This Subsection applies to the design of *sewage systems*.

8.2.1.2. Site Evaluation

(1) A site evaluation shall be conducted on every site where a new or replacement *sewage system* is to be installed.

(2) The *percolation time* shall be determined by either percolation tests or by classifying the *soil* according to the Unified Soil Classification System as described in Supplementary Standard SB-5.

(3) Where the *percolation time* is determined by a percolation test, there shall be a minimum of 3 locations selected, suitably spaced to accurately evaluate the *leaching bed* area, with the highest *percolation time* of the tests being used

8.2.1.3. Sewage System Design Flows

(1) For *residential occupancies*, the total daily design *sanitary sewage* flow shall be at least the value in Column 2 as determined from Table 8.2.1.3.A.

(2) For all other *occupancies*, the total daily design *sanitary sewage* flow shall be at least the value in Column 2 as determined from Table 8.2.1.3.B.

(3) Where a *building* contains more than one establishment, the total daily design *sanitary sewage* flow shall be the sum of the total daily design *sanitary sewage* flow for each establishment.

(4) Where an *occupancy* is not listed in Table 8.2.1.3.B., the highest of metered flow data from at least 3 similar establishments shall be acceptable for determining total daily design *sanitary sewage* flow.

Table 8.2.1.3.A.
Residential Occupancy

Forming Part of Sentence 8.2.1.3.(1)

COLUMN 1	COLUMN 2
Residential Occupancy	Volume, litres
Apartments, Condominiums, Other Multi-family Dwellings - per person(1)	275
Boarding Houses	
a) Per person,	
i) with meals and laundry facilities, or,	200
ii) without meal or laundry facilities, and	150
b) Per non-resident staff per 8 hour shift	40
Boarding School - per person	300
Dwellings	
a) 1 bedroom dwelling	750
b) 2 bedroom dwelling	1100
c) 3 bedroom dwelling	1600
d) 4 bedroom dwelling	2000
e) 5 bedroom dwelling	2500
f) Additional flow for(2)	
i) each bedroom over 5,	500
ii) A) each 10 m^2 (or part of it) over 200 m^2 up to 400 m^2 (3),	100
B) each 10 m^2 (or part of it) over 400 m2 up to 600 m^2 (3), and	75
C) each 10 m^2 (or part of it) over 600 m^2 (3), or	50
iii) each fixture unit over 20 fixture units	50
Hotels and Motels (excluding bars and restaurants)	
a) Regular, per room	250
b) Resort hotel, cottage, per person	500
c) Self service laundry, add per machine	2500
Work Camp/Construction Camp, semi-permanent per worker	250

Notes to Table 8.2.1.3.A.:

(1) The *occupant load* shall be calculated using Subsection 3.1.17.

(2) Where multiple calculations of sewage volume is permitted the calculation resulting the highest flow shall be used in determining the design daily *sanitary sewage* flow.

(3) Total finished area, excluding the area of the finished *basement*.

Table 8.2.1.3.B.
Other Occupancies

Forming Part of Sentence 8.2.1.3.(2)

COLUMN 1	COLUMN 2
Establishments(1)	Volume, litres
Airports, Bus Terminals, Train Stations, Dock/Port Facilities (Food Services excluded)	
a) Per passenger, and	20
b) Per employee per 8 hour shift	40
Assembly Hall - per seat	
a) No food service, or	8
b) Food service provided	36
Barber Shop/Beauty Salon - per service chair	650
Bowling Alleys (Food Service not included) - per lane	400
Churches and Similar Places of Worship - per seat	
a) No kitchen facilities, or	8
b) Kitchen facilities provided	36
Country Club (excluding Food Service)	
a) Per resident,	375
b) Per employee per 8 hour shift, and	50
c) Per member or patron	40
Day Care Facility per person (staff and children)	75
Dentist Office	
a) Per wet service chair, and	275
b) Per dry service chair	190
Doctors Office	
a) Per practitioner, and	275
b) Per employee per 8 hour shift	75
Factory (excluding process or cleaning waters) - per employee per 8 hour shift	
a) No showers, or	75
b) Including showers	125
Flea Markets(2) (open not more than 3 days per week)	
a) Per non-food service vendor space,	60
b) Per food service establishment / 9.25 m^2 of floor space, and	190
c) Per limited food service outlet	95
Food Service Operations	
a) Restaurant (not 24 hour), per seat	125
b) Restaurant (24 hour), per seat	200
c) Restaurant on controlled access highway, per seat	400
d) Paper service restaurant, per seat	60
e) Donut shop, per seat	400
f) Bar and cocktail lounge, per seat	125
g) Drive-in restaurant per parking space	60
h) Take-out restaurant (no seating area)	
i) per 9.25 m^2 of floor area, and	190
ii) per employee per 8 hour shift	75
i) Cafeteria - per meal	12
j) Food outlet	
i) excluding delicatessen, bakery and meat department, per 9.25 m^2 of floor space,	40
ii) per 9.25 m^2 of delicatessen floor space,	190
iii) per 9.25 m^2 of bakery floor space,	190
iv) per 9.25 m^2 of meat department floor space, and	380
v) per water closet	950
Hospitals - per bed	
a) Including laundry facilities, or	750
b) Excluding laundry facilities	550
Nursing Homes, Rest Homes, etc. - per bed	450
Office Building(3)	
a) Per employee per 8 hour shift, or	75
b) Per each 9.3 m^2 of floor space	75
Public Parks	
a) With toilets only per person, or	20
b) With bathhouse, showers, and toilets per person	50

COLUMN 1 Establishments[1]	COLUMN 2 Volume, litres
Recreational Vehicle or Campground Park	
a) Per site without water or sewer hook-up, or	275
b) Per site with water and sewer hook-up	425
Schools - per student	
a) Day school,	30
b) With showers,	30
c) With cafeteria, and	30
d) Per non-teaching employee per 8 hour shift	50
Service Stations (no vehicle washing)[3]	
a) Per water closet, and	950
i) per fuel outlet[4], or	560
ii) per vehicle served	20
Shopping Centre (excluding food and laundry) - per 1.0 m^2 of floor space	5
Stadiums, Race Tracks, Ball Parks - per seat	20
Stores[3]	
a) Per 1.0 m^2 of floor area, or	5
b) Per water closet	1230
Swimming and Bathing Facilities (Public) - per person	40
Theatres	
a) Indoor, auditoriums per seat,	20
b) Outdoor, drive-ins per space, or	40
c) Movie theatres per seat	15
Veterinary Clinics	
a) Per practitioner,	275
b) Per employee per 8 hour shift, and	75
c) Per stall, kennel, or cage if floor drain connected	75
Warehouse	
a) Per water closet, and	950
b) Per loading bay	150

Notes to Table 8.2.1.3.B.:

[1] The *occupant load* shall be calculated using Subsection 3.1.17.

[2] Flea markets open more than 3 days per week shall be assessed using the volumes stated under the heading "Stores".

[3] Where multiple calculations of *sanitary sewage* volume is permitted the calculation resulting in the highest flow shall be used in determining the design daily *sanitary sewage* flow.

[4] The number of fuel outlets is considered the maximum number of gas nozzles that could be in use at the same time.

8.2.1.4. Clearances

(1) Unless it can be shown to be unnecessary, where the *percolation time* is 10 minutes or greater, the location of all components within a *sewage system* shall be in conformance with the clearances listed in Articles 8.2.1.5. or 8.2.1.6.

(2) Unless it can be shown to be unnecessary, where the *percolation time* is less than 10 minutes, the clearances listed in Articles 8.2.1.5. and 8.2.1.6. for wells, lakes, ponds, reservoirs, rivers, springs or streams shall be increased to compensate for the lower *percolation time*.

(3) No *building* shall be *constructed* closer to any part of a *sewage system* than the clearances listed in Articles 8.2.1.5. or 8.2.1.6.

(4) If more than one *sewage system* is located on a lot or parcel of land, there shall be no overlap of any part of the systems.

8.2.1.5. Clearance Distances for Class 1, 2 and 3 Sewage Systems

(1) Except as provided in Sentences 8.2.1.4.(1) and (2), no Class 1, 2, or 3 *sewage system* shall have a horizontal distance of less than that permitted by Table 8.2.1.5.

Table 8.2.1.5.
Clearance Distances for Class 1, 2 and 3 Sewage Systems

Forming Part of Sentence 8.2.1.5.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5
Sewage System	Minimum horizontal distance in metres from a well with watertight casing to a depth of at least 6 m	Minimum horizontal distance in metres from a spring used as a source of *potable* water or well other than a well with a water tight casing to a depth of at least 6 m	Minimum horizontal distance in metres from a lake, river, pond, stream, reservoir, or a spring not used as a source of *potable* water	Minimum horizontal distance in metres from a property line
Earth Pit Privy	15	30	15	3
Privy Vault *Pail Privy*	10	15	10	3
Greywater System	10	15	15	3
Cesspool	30	60	15	3

8.2.1.6. Clearances for a Class 4 or 5 Sewage System

(1) Except as provided in Sentences 8.2.1.4.(1) and (2), a *treatment unit* shall not be located closer than the minimum horizontal distances as set out in Table 8.2.1.6.A.

Table 8.2.1.6.A.
Minimum Clearances for Treatment Units

Forming Part of Sentence 8.2.1.6.(1)

COLUMN 1	COLUMN 2
Object	Minimum Clearance, m
Structure	1.5
Well	15
Lake	15
Pond	15
Reservoir	15
River	15
Spring	15
Stream	15
Property Line	3

(2) Except as provided in Sentences 8.2.1.4.(1) and (2), a *distribution pipe* shall not be located closer than the minimum horizontal distances set out in Table 8.2.1.6.B. and these distances shall be increased when required by Sentence 8.7.4.2.(9).

Table 8.2.1.6.B.
Minimum Clearances for Distribution Piping

Forming Part of Sentence 8.2.1.6.(2)

COLUMN 1	COLUMN 2
Object	Minimum Clearance, m
Structure	5
Well with a watertight casing to a depth of 6 m	15
Any other well	30
Lake	15
Pond	15
Reservoir	15
River	15
Spring not used as a source of *potable* water	15
Stream	15
Property Line	3

(3) Except as provided in Sentences 8.2.1.4.(1) and (2), a *holding tank* shall not be located closer than the minimum horizontal distances set out in Table 8.2.1.6.C.

Table 8.2.1.6.C.
Minimum Clearances for Holding Tanks

Forming Part of Sentence 8.2.1.6.(3)

COLUMN 1	COLUMN 2
Object	Minimum Clearance, m
Structure	1.5
Well with a watertight casing to a depth of at least 6 m	15
Any other well	15
Spring	15
Property Line	3

8.2.2. Treatment and Holding Tanks

8.2.2.1. Application

(1) This Subsection applies to any tank used in a *sewage system* for collecting, treating, holding or storing *sanitary sewage.*

8.2.2.2. Tanks

(1) Subject to Sentence (3), a tank that is used as a *treatment unit* in a Class 4 *sewage system* or a *holding tank* in a Class 5 *sewage system* shall conform to the requirements of CSA B66, "Design, Material, and Manufacturing Requirements for Prefabricated Septic Tanks and Sewage Holding Tanks".

(2) Subject to Sentence (3), material standards, access and *construction* methods and practices for a tank used for other Classes of *sewage systems* shall conform to the requirements of CSA B66, "Design, Material, and Manufacturing Requirements for Prefabricated Septic Tanks and Sewage Holding Tanks".

(3) Tanks referred to in Sentences (1) and (2) are not required to conform to the requirements of Clause 10.2.(j) of CSA B66 "Design, Material, and Manufacturing Requirements for Prefabricated Septic Tanks and Sewage Holding Tanks".

(4) Sentence (2) does not apply to a tank that is an integral part of a prefabricated Class 1 *sewage system.*

(5) Access openings shall be located to facilitate the pumping of all compartments and the servicing of the inlet and outlet of each compartment not accessible by removal of the tank top or part of it.

(6) A tank shall not be covered by *soil* or *leaching bed fill* having a depth greater than the maximum depth of burial that the tank is designed to withstand.

(7) A tank shall be securely anchored when located in an area subject to flooding or where *ground water* levels may cause hydrostatic pressures.

8.2.2.3. Septic Tanks

(1) The minimum *working capacity* of a *septic tank* shall be the greater of 3 600 L and,

(a) in *residential occupancies*, twice the daily design *sanitary sewage* flow, or

(b) in non-*residential occupancies*, three times the daily design *sanitary sewage* flow.

(2) Every *septic tank* shall be *constructed* in such a manner that any *sanitary sewage* flowing through the tank will pass through at least 2 compartments.

(3) The *working capacity* of the compartments required in Sentence (2) shall be sized such that,

(a) the first compartment is at least 1.3 times the daily design *sanitary sewage* flow but in no case less than 2 400 L, and

(b) each subsequent compartment shall be at least 50% of the first compartment.

(4) Where multiple tanks are to be used to meet the requirements of Sentences (2) and (3), the tanks shall be connected in series such that,

(a) the first tank in the series shall have at least a capacity as calculated in Clause (3)(a), however at no time shall a tank having a *working capacity* of less than 3 600 L be used,

(b) all additional tanks after the first tank, excluding pump or dosing tanks shall have at least a *working capacity* equal to Clause (3)(b),

(c) the pipe between the outlet of one tank and the inlet of the next tank in the series shall have a minimum slope of 2 per cent,

(d) there shall be no partitions in the tank except where a partition is required to maintain the structural integrity of the tank, in which case openings within the partition shall be provided to allow the free movement of *sanitary sewage* throughout the tank, and

(e) all piping between tanks shall be continuous and shall be connected to the tank through the use of flexible watertight seals that will permit differential movement between the tanks.

(5) Partitions separating the *septic tank* into compartments shall extend at least 150 mm above the liquid level at the outlet, and there shall be one or more openings through or above the partition.

(6) The openings required between compartments referred to in Sentence (2) shall have a total cross-sectional area of at least three times the area of the inlet pipe and be located between the top and a level 150 mm above the liquid level at the outlet to provide for the free flow of air between compartments.

(7) *Sanitary sewage* shall pass from one compartment to another of the *septic tank* by means of either,

(a) a device similar to that described in CSA B66, "Design, Material, and Manufacturing Requirements for Prefabricated Septic Tanks and Sewage Holding Tanks" for outlet devices, or

(b) through two or more openings through the partition located in a horizontal line, and evenly spaced across the width of the partition, centred at approximately 40% of the liquid depth below the surface of the liquid, and having a total area of between three and five times that of the cross-sectional area of the inlet pipe.

(8) A *septic tank* shall be of such design and *construction* as will permit the collection and holding of *sanitary sewage* in it to a depth of not less than 1 200 mm except that a depth of not less than 900 mm is permitted where the excavation is in rock, or to avoid rupture or displacement of the tank due to *ground water* pressure.

(9) Except as provided in Sentences (10) and (11), every *septic tank* shall be installed in such a manner that the access openings are located not more than 300 mm below the ground surface.

(10) Where the top of the *septic tank* is located more than 300 mm below the ground surface, it shall be equipped with risers that extend from the access opening of the *septic tank* to within 300 mm of the ground surface.

(11) Where risers are used they shall conform to the requirements of CSA B66, "Design, Material, and Manufacturing Requirements for Prefabricated Septic Tanks and Sewage Holding Tanks", and shall have adequate access openings to allow for regular maintenance of the *septic tank*.

8.2.2.4. Holding Tanks

(1) All *holding tanks* shall be of such design and *construction* as will allow the complete removal of solid matter that can be expected to settle in the *holding tank* through an apparatus or device suitable for allowing the contents of the *holding tank* to be removed from the *holding tank*.

(2) A *holding tank* shall have a *working capacity* of not less than 9 000 L.

(3) Where two or more tanks are used to meet the requirement of Sentence (2), they shall be deemed to be one *holding tank* provided they are connected in such a manner as will allow the *sanitary sewage* contained in them to flow between the tanks.

(4) The *working capacity* of the tanks described in Sentence (3) shall not include any portion of any tank that cannot be completely drained due to the manner in which the connections are made.

Section 8.3. Class 1 Sewage Systems

8.3.1. General Requirements

8.3.1.1. Scope

(1) This Section applies to the *construction* of a Class 1 *sewage system*.

8.3.1.2. Application

(1) Except as provided in Sentence (2), a Class 1 *sewage system* shall be designed to receive only human body waste for disposal.

(2) Where the *sewage* system is specifically designed for the biological decomposition of non-waterborne biodegradable kitchen wastes or requires the addition of small quantities of plant matter to improve the decomposition of human body waste, it may receive such wastes in addition to human body waste.

(3) Where the *sewage* system is designed with a drain for the removal of excess liquid, then the *sewage system* shall drain to a Class 3, 4, or 5 *sewage system*.

8.3.2. Superstructure Requirements

8.3.2.1. Construction Requirements

(1) A privy as described in Subsections 8.3.3. to 8.3.5. shall be enclosed with a superstructure that,

(a) is *constructed* of strong durable weatherproof materials,

(b) has a solid floor supported by a sill *constructed* of treated timber, masonry or other material of at least equal strength and durability,

(c) is easily sanitized,

(d) unless it is equipped solely as a urinal, is equipped with one or more seats each having a cover and being supported by an enclosed bench or riser that is lined with an impervious material on all interior vertical surfaces,

(e) is equipped with a self-closing door,

(f) has one or more openings for purposes of ventilation, all of which are screened,

(g) has a ventilation duct that is screened at the top end and that extends from the underside of the bench or riser to a point above the roof of the superstructure, and

(h) shall not have any openings for the reception of human body waste, other than urinals and those *constructed* in accordance with Clause (1)(d).

8.3.3. Earth Pit Privy

8.3.3.1. Construction Requirements

(1) An *earth pit privy* shall be *constructed* in the following manner:

(a) the bottom of the pit shall be at least 900 mm above the *high ground water table*,

(b) the sides of the pit shall be reinforced so as to prevent collapse of them,

(c) the pit shall be surrounded on all sides and on its bottom by not less than 600 mm of *soil* or *leaching bed fill*, and

(d) the *soil* or *leaching bed fill* around the base of the sides of the superstructure of the *earth pit privy* shall be raised or mounded to a height of at least 150 mm above ground level.

8.3.4. Privy Vaults and Pail Privy

8.3.4.1. Construction Requirements

(1) A *privy-vault* or a *pail privy* shall be *constructed* in the following manner:

(a) the container or structure that is to be used for the holding or storage of *sanitary sewage* shall be watertight and made of a material that can be easily cleaned,

(b) the *soil* or *leaching bed fill* around the base of the sides of the superstructure shall be raised or mounded to a height of at least 150 mm above ground level, and

(c) the surface of the ground in the area of the *privy-vault* or *pail privy* shall be so graded that surface drainage will be diverted away from the privy.

8.3.5. Portable Privy

8.3.5.1. Construction Requirements

(1) A *portable privy* shall be *constructed* in the following manner:

(a) the *portable privy* shall have a watertight receptacle that shall be suitable for the holding and storage of any *sanitary sewage* deposited in it,

(b) the receptacle for the holding and storage of sewage shall be designed and *constructed* in such a manner as to allow it to be easily emptied and cleaned, and

(c) the *portable privy* shall be *constructed* of such material and in such a manner that it can withstand the stresses to which it will be subjected during its transportation to and from sites where it is to be used and during loading and unloading from vehicles used for the transportation of the *portable privy* to and from sites where it is to be used.

Section 8.4. Class 2 Sewage Systems

8.4.1. General Requirements

8.4.1.1. Scope

(1) This Section applies to the *construction* of a Class 2 *sewage system*.

8.4.1.2. Application

(1) A Class 2 *sewage system* shall be designed only for the treatment and disposal of *greywater*.

(2) The total daily design flow for a Class 2 *sewage system* shall be calculated based on the *fixtures* discharging to the system as follows:

(a) 200 L per *fixture unit* where there is a supply of pressurized water, and

(b) 125 L per *fixture unit* where there is no supply of pressurized water.

8.4.2. Design and Construction Requirements

8.4.2.1. Construction Requirements

(1) The bottom of the pit shall be at least 900 mm above the *high ground water table*.

(2) The pit shall be *constructed* in such a manner as to prevent the collapse of its sidewalls.

(3) Any material used to support or form the sidewalls of the pit shall be an open jointed material of a type that will permit *leaching* from the pit.

(4) The pit shall be provided with a tight, strong cover that shall remain over the pit except when it is necessary to remove it for purposes of adding *greywater* to or removing *greywater* from the pit or for purposes of maintenance of the pit.

(5) The earth around the perimeter of the pit shall be raised or mounded to a height of at least 150 mm above ground level.

(6) The surface of the ground in the area of the pit shall be so graded that surface drainage in the area will be diverted away from the pit.

(7) The pit shall be surrounded on all sides and on its bottom by at least 600 mm of *soil* having a *percolation time* of less than 50 minutes.

8.4.2.2. Maximum Sewage Flow

(1) A Class 2 *sewage system* shall not be *constructed* where the daily design *greywater* flow to the system exceeds 1 000 L/day.

8.4.2.3. Sizing

(1) A Class 2 *sewage system* shall be designed and *constructed* so that the loading rate to the side walls shall be not more than the value calculated using the formula,

$$L_R = \frac{400}{T}$$

where,

L_R = *loading rate* of the sidewalls in litres per day/m^2, and

T = *percolation time*.

Section 8.5. Class 3 Sewage Systems

8.5.1. General Requirements

8.5.1.1. Scope

(1) This Section applies to the *construction* of a Class 3 *sewage system*.

8.5.1.2. Application

(1) A Class 3 *sewage system* shall not be *constructed* where the daily design *sanitary sewage* flow to the system exceeds 1 000 L/day.

(2) A Class 3 *sewage system* shall be designed to receive only the contents of a Class 1 *sewage system* or *effluent* from a Class 1 *sewage system* for disposal.

8.5.2. Design and Construction Requirements

8.5.2.1. Construction Requirements

(1) The bottom of the cesspool shall be at least 900 mm above the *high ground water table*.

(2) The cesspool shall be *constructed* in such a manner as to prevent the collapse of its sidewalls.

(3) Any material used to support or form the sidewalls of the cesspool shall be an open jointed material of a type that will permit *leaching* from the cesspool.

(4) The cesspool shall be provided with a tight strong cover that shall remain over the cesspool except when it is necessary to remove it for the purposes of adding *sanitary sewage* to or removing *sanitary sewage* from the cesspool or for purposes of maintenance of the cesspool.

(5) Where the cesspool extends to the ground surface, the cover required in Sentence (4) shall be lockable.

(6) The *soil* or *leaching bed fill* around the perimeter of the cesspool shall be raised or mounded to a height of at least 150 mm above ground level.

(7) The surface of the ground in the area of the cesspool shall be graded such that surface drainage in the area will be diverted away from the cesspool.

(8) The cesspool shall be surrounded on all sides and on its bottom by at least 600 mm of *soil* or *leaching bed fill*, except the top where the cesspool extends to the surface of the ground.

Section 8.6. Class 4 Sewage Systems

8.6.1. General Requirements

8.6.1.1. Scope

(1) This Section applies to the *construction* of a Class 4 *sewage system.*

8.6.1.2. General Requirements

(1) The *treatment unit* shall be connected to a *leaching bed constructed* in accordance with the requirements of Section 8.7.

8.6.1.3. Pumps and Siphons

(1) Where the total length of *distribution pipe* required is 150 m or more, the *sewage system* shall have at least one pump or a siphon contained in a dosing tank that may be a separate compartment within the tank structure, for distribution of the *effluent.*

(2) Alternating siphons shall not be installed in a *sewage system.*

(3) Where 2 or more pumps are employed within a dosing tank, the pumps shall be designed such that the pumps alternate dosing, and dosing shall continue in the event that one pump fails.

(4) Where a pump or siphon is required, the pump or siphon shall be designed to discharge a dose of at least 75% of the internal volume of the *distribution pipe* within a time period not exceeding fifteen minutes.

8.6.2. Treatment Units

8.6.2.1. Septic Tank Systems

(1) An *effluent* filter shall be installed in the outlet flow path of every *septic tank* that discharges *effluent* to a *leaching bed.*

(2) The *septic tank effluent* filter required by Sentence (1) shall conform to the requirements of NSF/ANSI 46, "Evaluation of Components and Devices Used in Wastewater Treatment Systems", and shall be sized and installed in accordance with the manufacturer's recommendations.

(3) A secured access opening to allow for regular maintenance of the *effluent* filter shall be provided at the ground surface.

8.6.2.2. Other Treatment Units

(1) A *treatment unit* other than those described in Article 8.6.2.1. and Sentence (2) shall be designed such that *effluent* does not exceed the maximum concentrations stipulated in Column 2 of Table 8.6.2.2.A

(2) A *treatment unit* that is used in conjunction with a *leaching bed constructed* as *shallow buried trenches* shall be designed such that the *effluent* does not exceed the maximum concentrations stipulated in Column 3 of Table 8.6.2.2.A.

(3) All *treatment units* referred to in Sentences (1) and (2) that contain mechanical components shall be equipped with an audible and visual warning alarm so located to warn the occupants of the *building* served or the operator of the *treatment unit* of a malfunction in the operation of the *treatment unit.*

(4) All *treatment units* referred to in Sentences (1) and (2) shall permit the sampling of the *effluent.*

(5) A *treatment unit* described in the Supplementary Standard SB-5 is deemed to comply with the requirements of Table 8.6.2.2.A.

(6) Every manufacturer or distributor of a *treatment unit* shall provide, for each model sold, printed literature that describes the unit in detail and provides complete instructions regarding the operation, servicing, and maintenance requirements of the unit and its related components necessary to ensure the continued proper operation in accordance with the original design and specifications.

Table 8.6.2.2.A.
Other Treatment Unit Effluent Quality Criteria

Forming Part of Sentence 8.6.2.2.(1), (2) and (5)

COLUMN 1	COLUMN 2	COLUMN 3
Parameter	Secondary *Effluent*(1)	*Tertiary Effluent*(1)
BOD_5	40	15
$CBOD_5$	30	10
Suspended Solids	30	10

Note to Table 8.6.2.2.A.:

(1) Maximum concentration based on 30 day averages in milligrams per litre (mg/L)

Section 8.7. Leaching Beds

8.7.1. General Requirements

8.7.1.1. Application

(1) This Section is applicable to the *construction* of *leaching beds*.

8.7.2. Construction Requirements

8.7.2.1. General Requirements

(1) A *leaching bed* shall not be located,

(a) in an area that has an average slope that exceeds one unit vertically to four units horizontally,

(b) in *soil* or *leaching bed fill* having a *percolation time* of,

(i) less than one minute, or greater than 125 minutes if *constructed* as a *shallow buried trench*, or

(ii) less than one minute, or greater than 50 minutes for all other *leaching beds*, or

(c) in or on an area that is subject to flooding that may be expected to cause damage to the *leaching bed* or impair the operation of the *leaching bed*.

(2) A *leaching bed* shall not be covered with any material having a hydraulic conductivity less than 0.01 m/day.

(3) The surface of the *leaching bed* shall be shaped to shed water and together with the side slopes of any raised portion, shall be protected against erosion in such a manner as to not inhibit the evaporation and transpiration of waters from the *soil* or *leaching bed fill*, and to not cause plugging of the *distribution pipe*.

(4) No part of a *leaching bed* shall be sloped steeper than 1 unit vertically to 4 units horizontally.

(5) A *leaching bed* shall be designed to be protected from compaction or any stress or pressure that may result in,

(a) the impairment or destruction of any pipe in the *leaching bed*, or

(b) the *soil* or *leaching bed fill*.

8.7.3. Absorption Trench Construction

8.7.3.1. Length of Distribution Pipe

(1) The total length of *distribution piping* shall,

(a) not be less than 30 m when *constructed* as a *shallow buried trench*, or

(b) not be less than 40 m for any other *absorption trench*.

(2) Except as provided in Sentences (1), (3), and (4) every *leaching bed constructed* by means of *absorption trenches* shall have a total length of *distribution pipe* not less than the value determined by the formula,

$$L = \frac{QT}{200}$$

where,

L = total length of *distribution pipe* in metres

Q = the total daily design *sanitary sewage* flow in litres

T = the design *percolation time*

(3) Except as provided in Sentence (1), where the *treatment unit* is described in Article 8.6.2.2., the *leaching bed* may have a total length of *distribution pipe* not less than the value determined by the formula,

$$L = \frac{QT}{300}$$

where,

L = total length of *distribution pipe* in metres

Q = the total daily design *sanitary sewage* flow in litres

T = the design *percolation time*

(4) Except as provided in Sentence (1), where the *leaching bed* is *constructed* as a *shallow buried trench*, the total length of the *distribution pipe* shall not be less than the value determined by Table 8.7.3.1.

Table 8.7.3.1.
Length of Shallow Buried Trench

Forming Part of Sentence 8.7.3.1.(4)

COLUMN 1	COLUMN 2
Percolation Time, T of *soil*, min/cm	Trench Length, m
$1 < T \leq 20$	Q/75
$20 < T \leq 50$	Q/50
$50 < T < 125$	Q/30

where,

Q = the total daily design *sanitary sewage* flow in litres, and

T = the design *percolation time*.

8.7.3.2. Absorption Trenches

(1) Except as provided in Sentence (2), *absorption trenches* shall be,

(a) approximately the same length and not more than 30 m in length,

(b) not less than 500 mm and not more than 1 000 mm in width,

(c) not less than 300 mm and not more than 900 mm in depth,

(d) centred not less than 1 600 mm apart,

(e) located so that the bottom of the trench is not less than 900 mm above the *high ground water table*, rock or *soil* with a *percolation time* more than 50 minutes, and

(f) backfilled, after the installation of the *distribution pipe* with *leaching bed fill*, so as to ensure that after the *leaching bed fill* settles, the surface of the *leaching bed* will not form any depressions.

(2) *Absorption trenches constructed* as *shallow buried trenches* shall be,

(a) approximately the same length and not more than 30 m in length,

(b) not less than 300 mm and not more than 600 mm in width,

(c) not less than 300 mm and not more than 600 mm in depth,

(d) centred not less than 2 000 mm apart,

(e) not less than 900 mm at all points on the bottom of the *absorption trench* above the *high ground water table* or rock, and

(f) backfilled, after the installation of the *distribution pipe* with *leaching bed fill*, so as to ensure that after the *leaching bed fill* settles, the surface of the *leaching bed* will not form any depressions.

8.7.3.3. Distribution Pipe

(1) Except for *shallow buried trenches*, the *distribution pipe* used in the *construction* of a *leaching bed* shall be,

(a) of not less than 3 in. trade *size* for gravity flow systems, or 1 in. trade *size* for pressurized systems,

(b) installed with a uniform downward slope from the inlet with a drop of not less than 30 mm and not more than 50 mm for each 10 m of *distribution pipe*, and

(c) installed within a layer of stone conforming to Sentence (5).

(2) Prior to backfilling, the stone layer required in Clause (1)(c) shall be protected in such a manner so as to prevent *soil*, or *leaching bed fill* from entering the stone by completely covering with,

(a) untreated building paper, or

(b) a permeable geo-textile fabric.

(3) Every pressurized *distribution pipe* shall be self-draining so as to prevent freezing of its contents.

(4) Every pressurized *distribution pipe* shall have orifices of at least 3 mm in diameter, spaced equally along the length of the pipe.

(5) The layer of stone required by Clause (1)(c) shall,

(a) be comprised of washed septic stone, free of fine material, with gradation conforming to Table 8.7.3.3.A.,

(b) be not less than 500 mm in width,

(c) extend not less than 150 mm below the *distribution pipe*, and

(d) extend not less than 50 mm above the *distribution pipe*.

Table 8.7.3.3.A.
Gradation of Septic Stone

Forming Part Of Sentence 8.7.3.3.(5)

COLUMN 1	COLUMN 2
Particle Size	Percent Passing
53 mm	100
19 mm	0-5
75 µm	0-1

8.7.4. Fill Based Absorption Trenches

8.7.4.1. Loading Requirements

(1) The area described in Sentence 8.7.4.2.(1) shall be designed such that the *loading rate* does not exceed, for *soil* having a *percolation time* set out in Column 1 of Table 8.7.4.1.A., the maximum value set out opposite it in Column 2 of Table 8.7.4.1.A.

Table 8.7.4.1.A.
Loading Rates for Fill Based Absorption Trenches and Filter Beds

Forming Part of Sentences 8.7.4.1.(1) and 8.7.5.2.(2)

COLUMN 1	COLUMN 2
Percolation Time (T) of *Soil*, min/cm	Loading Rates, (L/m^2)/day
$1 < T \leq 20$	10
$20 < T \leq 35$	8
$35 < T \leq 50$	6
$T > 50$	4

8.7.4.2. Construction Requirements

(1) A *leaching bed* comprised of *absorption trenches* may be *constructed* in *leaching bed fill* if unsaturated *soil* or *leaching bed fill* complying with Clause 8.7.2.1.(1)(b) extends,

(a) to a depth of at least 250 mm over the area covered by the *leaching bed fill*, and

(b) for at least 15 m beyond the outer *distribution pipes* in any direction in which the *effluent* entering the *soil* or *leaching bed fill* will move horizontally.

(2) If the unsaturated *soil* or *leaching bed fill* described in Sentence (1) has a *percolation time* greater than 15 minutes, any *leaching bed fill* added to form the *leaching bed* shall have a *percolation time* not less than 75% of the *percolation time* of the unsaturated *soil* or *leaching bed fill*.

(3) *Leaching bed fill* that does not meet the requirements of Sentence (2) may be used to form the *leaching bed* if,

(a) the distance from the bottom of the *absorption trench* to native *soil* is not less than 900 mm, or

(b) where the distance from the bottom of the *absorption trench* to native *soil* is less than 900 mm, the *percolation time* of the least permeable *soil* or *leaching bed fill* within 900 mm from the bottom of the *absorption trench* is used to calculate the length of the *distribution pipe* under Article 8.7.3.1.

(4) Sentence (2) does not apply to any *leaching bed fill* added as backfill above the stone layer in which the *distribution pipe* is located.

(5) All *leaching bed fill* added shall be stabilized against erosion.

(6) The site to which the *leaching bed fill* is added shall be generally clear of vegetation.

(7) The *leaching bed fill* that is added shall be compacted in layers in such a manner as to avoid uneven settlement of the *distribution pipes*.

(8) Any *distribution boxes, header lines, absorption trenches*, or *distribution pipes* shall be installed only after the *leaching bed fill* has been compacted in accordance with Sentence (7).

(9) Except as provided in Sentence (10), the sides of the added *leaching bed fill* shall be sloped to ensure stability, but shall not be steeper than one unit vertically to four units horizontally.

(10) The side slope of the *leaching bed fill* may be increased up to one unit vertically to three units horizontally if measures are taken to prevent erosion and ensure stability of the *leaching bed fill*.

(11) The distances as set out in Column 2 of Table 8.2.1.6.B. shall be increased by twice the height that the *leaching bed* is raised above the original grade.

8.7.5. Filter Beds

8.7.5.1. Application

(1) The total daily design *sanitary sewage* flow shall not exceed 5 000 L where the *treatment unit* is a *septic tank*, or 10 000 L where the *treatment unit* is described in Article 8.6.2.2.

8.7.5.2. Loading Requirements

(1) The effective area of the surface of the filter medium in each filter bed shall be at least 10 m^2 and not more than 50 m^2.

(2) The area described in Sentence 8.7.4.2.(1) shall be designed such that the *loading rate* does not exceed, for *soil* having a *percolation time* set out in Column 1 of Table 8.7.4.1.A., the maximum value set out opposite thereto in Column 2 of Table 8.7.4.1.A.

(3) Except as provided in Sentence (5), where the total daily design *sanitary sewage* flow does not exceed 3 000 L, the effective area shall be such that the loading on the surface of the filter medium does not exceed 75 L/m^2 per day.

(4) Except as provided in Sentence (5), where the total daily design *sanitary sewage* flow exceeds 3 000 L,

(a) the effective area shall be such that the loading on the surface of the filter medium does not exceed 50 L/m^2 per day, and

(b) the *leaching bed* shall be comprised of more than one filter bed, each of similar size and adjacent to each other.

(5) Where a *treatment unit* designed to produce *effluent* not exceeding the maximum concentrations stipulated in Column 2 of Table 8.6.2.2.A. is used in conjunction with a filter bed, the effective area shall be such that the loading on the surface of the filter medium does not exceed 100 L/m^2 per day.

8.7.5.3. Construction Requirements

(1) Sentences 8.7.4.2.(1), (2) and (4) to (11) apply to the *construction* of a filter bed.

(2) The lines of *distribution pipe* shall be evenly spaced over the surface of the filter medium to which the *sanitary sewage* is applied.

(3) The filter medium shall have a minimum depth of 750 mm below the stone layer and shall be clean sand comprised of particles ranging in size between the limits of,

(a) an effective size of 0.25 mm with a uniformity coefficient not less than 3.5,

(b) an effective size of 2.5 mm with a uniformity coefficient not greater than 1.5, and

(c) having a uniformity coefficient not greater than 4.5.

(4) The filter medium shall be unsaturated for its entire depth.

(5) Where there is more than one filter bed in a *leaching bed*, the filter beds shall be separated by at least 5 m between the *distribution pipes* of the filter beds.

(6) The base of the filter medium shall extend to a thickness of at least 250 mm over an area meeting the requirements of the following formula:

$$A = \frac{QT}{850}$$

where,

A = the area of contact in square metres between the base of the filter medium and the underlying *soil*,

Q = the total daily design *sanitary sewage flow* in litres, and

T = the lesser of 50 and the *percolation time* of the underlying *soil*.

(7) The stone layer required by Clause 8.7.3.3.(1)(b) shall be not less than 900 mm above the *high ground water table*, rock or *soil* with a *percolation time* more than 50 minutes.

8.7.6. Shallow Buried Trenches

8.7.6.1. Limitation on Installation

(1) The design and installation of a *shallow buried trench* shall be carried out by a person competent in this field of work.

8.7.6.2. Construction Requirements

(1) The *treatment unit* shall provide an *effluent* quality as required in Sentence 8.6.2.2.(2).

(2) The *effluent* shall be distributed through a *pressurized distribution system* having a pressure head of not less than 600 mm when measured to the most distant point from the pump.

(3) The pump chamber shall be sized to provide sufficient storage volume so that the *effluent* is evenly dosed on an hourly basis over a 24-hour period.

(4) A *shallow buried trench* shall not be *constructed* unless the *soil* or *leaching bed fill* is sufficiently dry to resist the compaction and smearing during excavation.

(5) Every *chamber* shall be as wide as the *shallow buried trench* in which it is contained, and the cross-sectional height of the *chamber* at its centre point shall not be less than half the width of the trench.

(6) Every *chamber* shall contain only one pressurized *distribution pipe*.

Section 8.8. Class 5 Sewage Systems

8.8.1. Application

8.8.1.1. Prohibited Installation

(1) Except as provided in Article 8.8.1.2., a Class 5 *sewage system* shall not be installed.

8.8.1.2. Acceptable Installation

(1) A Class 5 *sewage system* may be installed in the following circumstances:

(a) where the proposed use of the *sewage system* is for a temporary operation, excluding seasonal recreational use, not exceeding 12 months in duration,

(b) to remedy an unsafe *sewage system* where the remediation of the unsafe condition by the installation of a Class 4 *sewage system* is impracticable,

(c) to upgrade a *sewage system* serving an existing *building*, where upgrading through the use of a Class 4 *sewage system* is not possible due to lot size, site slope or clearance limitations, or

(d) as an interim measure for a lot or parcel of land until municipal sewers are available, provided that the municipality undertakes to ensure the continued operation of an approved *hauled sewage system* until the municipal sewers are available.

(2) Where a Class 5 *sewage system* is installed, a written agreement for the disposal of *sanitary sewage* from the *sewage system* shall be entered into with a *hauled sewage system* operator.

8.8.2. General Requirements

8.8.2.1. Construction Requirements

(1) All Class 5 *sewage systems* shall be equipped with a device that shall produce an audible and visual warning alarm so located to warn that the *sewage system* is nearing capacity.

(2) The device required in Sentence (1) shall be designed to provide suitable advance warning to the *building* occupants considering,

(a) the total daily design *sanitary sewage* flow,

(b) the location of the Class 5 *sewage system*, and

(c) the response time of the *hauled sewage system* contractor.

(3) Except as provided in Sentence (4) all *holding tanks* shall be provided with a vent that,

(a) is not less than 3 inch trade *size*,

(b) terminates at least,

  (i) 300 mm above finished grade with a vent cap, or

  (ii) 600 mm above finished grade with a vent cap when the *holding tank* is located in an area subject to flooding, and

(c) terminates at least 3.5 m away from any air inlet, window, or door.

(4) A vent from a *holding tank* may connect into the *venting system* of the *building* served by the *holding tank* provided that,

(a) the vent is not less than 3 in. trade *size*, and

(b) the installation of the vent shall conform to the requirements in Part 7.

8.8.2.2. Sizing of Holding Tanks

(1) All *holding tanks* used in residential dwellings shall have a minimum 7 day holding capacity based on the total daily design *sanitary sewage* flow.

Section 8.9. Operation and Maintenance

8.9.1. General

8.9.1.1. Scope

(1) This Section applies to the operation and maintenance of all *sewage systems*.

8.9.1.2. General Requirements for Operation and Maintenance

(1) Every *sewage system* shall be operated and maintained so that,

(a) the *sewage system* or any part of it shall not emit, discharge or deposit *sanitary sewage* or *effluent* onto the surface of the ground,

(b) *sanitary sewage* or *effluent* shall not emit, discharge, seep, leak or otherwise escape from the *sewage system* or any part of it other than from a place or part of the *sewage system* where the system is designed or intended to discharge the *sanitary sewage* or *effluent*, and

(c) except as provided in Sentence (2), *sanitary sewage* or *effluent* shall not emit, discharge, seep, leak or otherwise escape from the *sewage system* or any part of it into a piped water supply, well water supply, a watercourse, *ground water* or *surface water*.

(2) Clause (1)(c) does not apply to the use of a *sewage system* designed and operated such that properly treated *effluent* is discharged into *soil*.

8.9.2. Operation

8.9.2.1. Scope

(1) The requirement of this Subsection are in addition to the requirements of Subsection 8.9.1.

8.9.2.2. General

(1) Every *sewage system* shall be operated in accordance with,

(a) the basis on which the *construction* and use of the *sewage system* was approved or required under this Act or predecessor legislation, as the case may be, and

(b) the requirements of the manufacturer of the *sewage system*.

8.9.2.3. Class 4 Sewage Systems

(1) Every Class 4 *sewage system* shall be operated in accordance with the literature required in Sentence 8.6.2.2.(6).

(2) No person shall operate a *treatment unit* other than a *septic tank* unless the person has entered into an agreement whereby servicing and maintenance of the *treatment unit* and its related components will be carried out by a person who,

(a) possesses a copy of the literature required by Sentence 8.6.2.2.(6), and

(b) is authorized by the manufacturer to service and maintain that type of *treatment unit*.

(3) The person authorized by the manufacturer to service and maintain the *treatment unit* and who has entered into the agreement referred to in Sentence (2) with the person operating the *treatment unit* shall notify the *chief building official* if,

(a) the agreement is terminated, or

(b) access for service and maintenance of the *treatment unit* is denied by the person operating the *treatment unit*.

8.9.2.4. Shallow Buried Trenches

(1) Every person operating a *treatment unit* that is designed and *constructed* to produce *effluent* described in Column 3 of Table 8.6.2.2.A. shall, at the intervals described in Sentence (2),

(a) take a grab sample of the effluent to determine whether it complies with the levels contained in Column 3 of Table 8.6.2.2.A. for BOD_5 and suspended solids,

(b) carry out the sampling required by Clause (1)(a) in accordance with the methods described in the APHA/AWWA/WEF, "Standard Methods for the Examination of Water and Wastewater", and

(c) promptly submit the results of the sampling required by Clause (1)(a) to the *chief building official*.

(2) The sampling required by Clause (1)(a) shall be conducted,

(a) initially, once during the first 12 months after the *sewage system* was put into use, and

(b) after that, once during every 12 month period, at least 10 months and not more than 18 months after the previous sampling has been completed.

8.9.2.5. Class 5 Sewage Systems

(1) Every Class 5 *sewage system* shall be operated in accordance with the agreement referred to in Sentence 8.8.1.2.(2).

(2) No Class 5 *sewage system* shall be operated once it is filled with *sanitary sewage* until such time as the *sanitary sewage* is removed from the *sewage system*.

8.9.3. Maintenance

8.9.3.1. Scope

(1) The requirement of this Subsection are in addition to the requirements of Subsection 8.9.1.

8.9.3.2. General

(1) Every *sewage system* shall be maintained so that,

(a) the *construction* of the *sewage system* remains in accordance with,

  (i) the basis on which the *construction* and use of the *sewage system* was approved or required under this Act or predecessor legislation, as the case may be, and

  (ii) the requirements of the manufacturer of the *sewage system*, and

(b) all components of the *sewage system* function in their intended manner.

(2) The land in the vicinity of a *sewage system* shall be maintained in a condition that will not cause damage to, or impair the functioning of, the *sewage system*.

8.9.3.3. Interceptors

(1) Every grease *interceptor* referred to in Article 8.1.3.1. shall be maintained so that the grease retained is below the rated capacity of the *interceptor*.

8.9.3.4. Class 4 Sewage Systems

(1) *Septic tanks* and other *treatment units* shall be cleaned whenever sludge and scum occupy 1/3 of the *working capacity* of the tank.

8.9.3.5. Shallow Buried Trenches

(1) The pressure head at the furthest point from the pump in all *distribution pipes* shall be checked for compliance with Article 8.7.6.2. and the design specification at least every 36 months.

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HOUSING AND SMALL BUILDINGS

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PART 9
HOUSING AND SMALL BUILDINGS

Section 9.1. General

9.1.1. Application

9.1.1.1. Scope

(1) The scope of this Part shall be as described in Subsection 1.1.2. of Division A.

9.1.1.2. Signs

(1) Signs shall conform to the requirements in Section 3.15.

9.1.1.3. Self-Service Storage Buildings

(1) *Self-service storage buildings* shall conform to the requirements in Section 3.10.

9.1.1.4. Tents and Air-Supported Structures

(1) Tents shall conform to the requirements in Subsection 3.14.1.

(2) *Air-supported structures* shall conform to the requirements in Subsection 3.14.2.

9.1.1.5. Proximity to Existing Above Ground Electrical Conductors

(1) Where a *building* is constructed in close proximity to existing above ground electrical conductors the requirements of Subsection 3.1.19. shall apply.

9.1.1.6. Food Premises

(1) The requirements of Subsection 3.7.6. apply to all *food premises*.

9.1.1.7. Radon

(1) In addition to all other requirements, a *building* in the following designated areas shall be designed and constructed so that the annual average concentration of radon 222 does not exceed 250 millibecquerels per litre of air and the annual average concentration of the short lived daughters of radon 222 does not exceed 0.02 working levels inside the *building* for,

(a) the Town of Elliot Lake in the Territorial District of Algoma,

(b) the Township of Faraday in the County of Hastings, and

(c) the geographic Township of Hyman in the Territorial District of Sudbury.

9.1.1.8. Building in Flood Plains

(1) *Buildings* constructed on flood plains shall,

(a) be designed and constructed in accordance with good engineering practice to withstand anticipated vertical and horizontal hydrostatic pressures acting on the structure, and

(b) incorporate floodproofing measures that will preserve the integrity of *exits* and *means of egress* during times of flooding.

9.1.1.9. Site Assembled and Factory-Built Buildings

(1) Except as provided in Sentence (2), a manufactured *building* intended for *residential occupancy* is deemed to comply with this Code if it is designed and constructed in compliance with,

(a) CAN/CSA-Z240.2.1, "Structural Requirements for Mobile Homes", and CAN/CSA-Z240.3.1, "Plumbing Requirements for Mobile Homes", if the *building* is constructed in Sections not wider than 4.88 m, or

(b) CAN/CSA-A277, "Procedure for Certification of Factory-Built Houses".

(2) The requirements of this Code shall apply to,

(a) *building* components designed and constructed outside the place of manufacture, and

(b) site installation of such *buildings*.

Section 9.2. Reserved

Section 9.3. Materials, Systems and Equipment

9.3.1. Concrete

9.3.1.1. General

(1) Except as provided in Sentence (2), nominally unreinforced concrete shall be designed, mixed, placed, cured and tested in accordance with CAN/CSA-A438, "Concrete Construction for Housing and Small Buildings".

(2) Nominally unreinforced site-batched concrete shall be designed, mixed, placed and cured in accordance with Articles 9.3.1.2. to 9.3.1.9.

(3) Except as provided in Sentence (4), reinforced concrete shall be designed to conform to the requirements of Part 4.

(4) For flat insulating concrete form walls not exceeding 2 *storeys*, and having a maximum floor to floor height of 3 m, in *buildings* of light frame construction containing only a single *dwelling unit*, the concrete and reinforcing shall comply with Part 4 or,

(a) concrete shall conform to CAN/CSA-A23.1, "Concrete Materials and Methods of Concrete Construction", with a maximum aggregate size of 19 mm, and

(b) reinforcing shall,

(i) conform to CAN/CSA-G30.18-M, "Billet Steel Bars for Concrete Reinforcement",

(ii) have a minimum specified yield strength of 400 MPa, and

(iii) be lapped a minimum of 450 mm for 10M bars and 650 mm for 15 mm bars.

9.3.1.2. Cement

(1) Cement shall meet the requirements of CAN/CSA-A3001, "Cementitious Materials for Use in Concrete".

9.3.1.3. Concrete in Contact with Sulfate Soil

(1) Concrete in contact with sulfate *soil*, which is deleterious to normal cement, shall conform to the requirements in Clause 15.5 of CAN/CSA-A23.1, "Concrete Materials and Methods of Concrete Construction".

9.3.1.4. Aggregates

(1) Aggregates shall,

(a) consist of sand, gravel, crushed rock, crushed air-cooled blast furnace slag, expanded shale or expanded clay conforming to CAN/CSA-A23.1, "Concrete Materials and Methods of Concrete Construction", and

(b) be clean, well-graded and free of injurious amounts of organic and other deleterious material.

9.3.1.5. Water

(1) Water shall be clean and free of injurious amounts of oil, organic matter, sediment or any other deleterious material.

9.3.1.6. Compressive Strength

(1) Except as provided elsewhere in this Part, the compressive strength of unreinforced concrete after 28 days shall be not less than,

(a) 32 MPa for garage floors, carport floors and all exterior flatwork,

(b) 20 MPa for interior floors other than those for garages and carports, and

(c) 15 MPa for all other applications.

(2) Concrete used for garage and carport floors and exterior steps shall have air entrainment of 5 to 8%.

9.3.1.7. Concrete Mixes

(1) For site-batched concrete, the concrete mixes described in Table 9.3.1.7. shall be considered acceptable if the ratio of water to cementing materials does not exceed,

(a) 0.45 for garage floors, carport floors and all exterior flatwork,

(b) 0.65 for interior floors other than those for garages and carports, and

(c) 0.70 for all other applications.

(2) The size of aggregate in unreinforced concrete mixes referred to in Sentence (1) shall not exceed,

(a) 1/5 the distance between the sides of vertical forms, or

(b) 1/3 the thickness of flatwork.

Table 9.3.1.7.
Concrete Mixes

Forming Part of Sentence 9.3.1.7.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7
Maximum Size of Course Aggregate, mm	Materials, volume					
	Cement		Fine Aggregate (damp average course sand)		Course Aggregate (gravel or crushed stone)	
	Parts	L[1]	Parts	L	Parts	L
14	1	28	1.75	49	2	56
20	1	28	1.75	49	2.5	70
28	1	28	2	56	3	84
40	1	28	2	56	3.5	98

Notes to Table 9.3.1.7.:

(1) A 40 kg bag of cement contains 28 L.

9.3.1.8. Admixtures

(1) Admixtures shall conform to ASTM C260, "Air-Entraining Admixtures for Concrete", or ASTM C494 / C494M, "Chemical Admixtures for Concrete", as applicable.

9.3.1.9. Cold Weather Requirements

(1) When the air temperature is below 5°C , concrete shall be,

(a) kept at a temperature of not less than 10°C or more than 25°C while being placed, and

(b) maintained at a temperature of not less than 10°C for 72 h after placing.

(2) No frozen material or ice shall be used in concrete described in Sentence (1).

9.3.2. Lumber and Wood Products

9.3.2.1. Grade Marking

(1) Lumber for joists, rafters, trusses and beams and for the uses listed in Table 9.3.2.1. shall be identified by a grade stamp to indicate its grade as determined by the NLGA, "Standard Grading Rules for Canadian Lumber (Interpretation Included)".

Table 9.3.2.1.
Minimum Lumber Grades for Specific End Uses

Forming Part of Sentence 9.3.2.1.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5
Use	Boards			Framing
	Paragraph in the NLGA Grading Rules Under Which Boards are Graded			
	All Species		Eastern White Pine & Red Pine	All Species
	Para 113	Para 114	Para 118	
Stud wall framing (*loadbearing* members)	—	—	—	Stud, Standard, No. 2
Stud wall framing (non-*loadbearing* members)	—	—	—	Stud, Utility, No. 3
Plank frame construction (*loadbearing* members)	No. 3 Common	—	No. 3 Common	No. 2
Plank frame construction (non-*loadbearing* members)	No. 5 Common	—	No. 5 Common	Economy, No 3
Post and beams less than 114 mm in thickness	—	—	—	Standard, No.2
Post and beams not less than 114 mm in thickness	—	—	—	Standard
Roof sheathing	No. 3 Common	Standard	No. 4 Common	—
Subflooring	No. 3 common	Standard	No. 3 Common	—
Wall sheathing when required as a nailing base	No. 4 Common	Utility	No. 4 Common	—
Wall sheathing not required as a nailing base	No. 5 Common	Economy	No. 5 Common	—

9.3.2.2. Lumber Grades

(1) Except for joists, rafters, trusses and beams, visually graded lumber shall conform to the grades in Table 9.3.2.1.

9.3.2.3. Machine Stress Rated Lumber

(1) Machine stress rated lumber shall conform to the requirements of Subsection 4.3.1.

9.3.2.4. OSB, Waferboard and Plywood Marking

(1) OSB, waferboard and plywood used for roof sheathing, wall sheathing and subflooring shall be legibly identified on the face of the material indicating,

(a) the manufacturer of the material,

(b) the standard to which it is produced, and

(c) that the material is of an exterior type.

9.3.2.5. Moisture Content

(1) Moisture content of lumber shall be not more than 19% at the time of installation.

9.3.2.6. Lumber Dimensions

(1) Lumber dimensions referred to in this Part are actual dimensions determined in conformance with CSA O141, "Softwood Lumber".

9.3.2.7. Panel Thickness Tolerances

(1) The thickness specified in this Part for plywood, hardboard, particleboard, OSB and waferboard shall be subject to the tolerances permitted in the standards referenced for these products unless specifically indicated in this Part.

9.3.2.8. Undersized Lumber

(1) Joist, rafter, lintel and beam members up to 5% less than the actual Canadian standard sizes are permitted to be used provided the allowable spans for the grade and species of lumber under consideration are reduced 5% from those shown in the span tables for full size members.

9.3.2.9. Termite and Decay Protection

(1) In localities where termites are known to occur,

(a) clearance between structural wood elements and the finished ground level directly below them shall be not less than 450 mm and, except as provided in Sentence (2), all sides of the supporting elements shall be visible to permit inspection, or

(b) structural wood elements, supported by elements in contact with the ground or exposed over bare soil, shall be pressure-treated with a chemical that is toxic to termites.

(2) In localities where termites are known to occur and *foundations* are insulated or otherwise finished in a manner that could conceal a termite infestation,

(a) a metal or plastic barrier shall be installed through the insulation and any other separation or finish materials above finished ground level to control the passage of termites behind or through the insulation, separation or finish materials, and

(b) all sides of the finish supporting assembly shall be visible to permit inspection.

(3) Structural wood elements shall be pressure-treated with a preservative to resist decay,

(a) where the vertical clearance between structural wood elements and the finished ground level is less than 150 mm, or

(b) where,

  (i) the wood elements are not protected from exposure to precipitation, and

  (ii) the configuration is conducive to moisture accumulation.

(4) Structural wood elements used in retaining walls and cribbing shall be pressure-treated with a preservative to resist decay, where,

(a) the retaining wall or cribbing supports ground that is critical to the stability of *building foundations*, or

(b) the retaining wall or cribbing is greater than 1.2 m in height.

(5) Where wood is required by this Article to be treated to resist termites or decay, such treatment shall be in accordance with the requirements of,

(a) CSA O80.1, "Preservative Treatment of All Timber Products by Pressure Processes",

(b) CSA O80.2, "Preservative Treatment of Lumber, Timber, Bridge Ties and Mine Ties by Pressure Processes",

(c) CSA O80.9, "Preservative Treatment of Plywood by Pressure Processes",

(d) CSA O80.15, "Preservative Treatment of Wood for Building Foundation Systems, Basements and Crawl Spaces by Pressure Processes", or

(e) CSA O80.34, "Pressure Preservative Treatment of Lumber and Timbers with Borates for Use Out of Ground Contact and Continuously Protected from Liquid Water".

(6) In addition to the requirements of Clause (5)(e), where wood is protected in accordance with CSA O80.34, "Pressure Preservative Treatment of Lumber and Timbers with Borates for Use Out of Ground Contact and Continuously Protected from Liquid Water", the wood shall be,

(a) protected from direct exposure to moisture during and after the completion of construction, and

(b) separated from permeable supporting materials by a moisture barrier that is resistant to all expected mechanisms of deterioration in the service environment when the vertical clearance to the ground is less than 150 mm.

(7) Wood that is required by this Article to be treated to resist termites or decay shall be identified by a mark to indicate its conformance to the relevant required standard.

9.3.3. Metal

9.3.3.1. Sheet Metal Thickness

(1) Minimum thicknesses for sheet metal material required in this Part refer to the actual minimum base metal thicknesses measured at any point of the material, and in the case of galvanized steel described in Sentence 9.3.3.2.(1), include the thickness of the galvanizing coating unless otherwise indicated.

9.3.3.2. Galvanized Sheet Steel

(1) Where sheet steel is required to be galvanized, it shall be metallic-coated with zinc or an alloy of 55% aluminium-zinc meeting the requirements of,

(a) ASTM A653 / A653M, "Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealed) by the Hot-Dip Process", or

(b) ASTM A792 / A792M, "Sheet Steel, 55% Aluminum-Zinc Alloy-Coated by the Hot Dip Process".

(2) Where galvanized sheet steel is intended for use in locations exposed to the weather or as a flashing material, it shall have a zinc coating not less than the G90 (Z275) coating designation or an aluminum-zinc alloy coating not less than the AZM150 coating designation, as referred to in Sentence (1).

Section 9.4. Structural Requirements

9.4.1. Structural Design Requirements and Application Limitations

9.4.1.1. General

(1) Subject to the application limitations defined elsewhere in this Part, structural members and their connections shall,

(a) conform to requirements provided elsewhere in this Part,

(b) be designed according to good engineering practice such as provided in the CWC, "Engineering Guide for Wood Frame Construction", or

(c) be designed according to Part 4 using the loads and deflection and vibration limits specified in,

  (i) this Part,

  (ii) Part 4.

(2) Where floor framing is designed in accordance with Clause (1)(b) or (c) and where supporting wall framing and fastenings, or footings are designed according to Clause (1)(a), the specified *live load* on the floor shall not exceed 2.4 kPa.

(3) Location-specific information for structural design, including snow and wind loads and seismic spectral response accelerations, shall be determined according to Supplementary Standard SB-1.

9.4.2. Specified Loads

9.4.2.1. Application

(1) This Subsection applies to light-frame construction whose wall, floor and roof planes are generally comprised of frames of small repetitive structural members, and where,

(a) the roof and wall planes are clad, sheathed or braced on at least one side,

(b) the small repetitive structural members are spaced not more than 600 mm o.c.,

(c) the clear span of any structural member does not exceed 12.20 m,

(d) the maximum deflection of the structural roof members conforms to Article 9.4.3.1.,

(e) the maximum total roof area, notwithstanding any separation of adjoining *buildings* by *firewalls*, is 4 550 m^2, and

(f) for flat roofs, there are no significant obstructions on the roof, such as parapet walls, spaced closer than the distance calculated by,

$$D_o = 10(H_o - 0.8\ S_s/\gamma)$$

where,

D_o = minimum distance between obstructions, m,

H_o = height of the obstruction above the roof, m,

S_s = ground snow load, kPa, and

γ = unit weight of snow, kN/m^3.

9.4.2.2. Specified Design Snow Loads

(1) Except as provided in Sentences (2) and (3), specified snow loads shall be not less than those calculated using the following formula:

$$S = C_b \cdot S_s + S_r$$

where,

S = specified snow load,

C_b = basic snow load roof factor, which is 0.45 where the entire width of a roof does not exceed 4.3 m and 0.55 for all other roofs,

S_s = 1-in-50 year ground snow load in kPa, determined according to Supplementary Standard SB-1, and

S_r = associated 1-in-50 year rain load in kPa, determined according to Supplementary Standard SB-1.

(2) In no case shall the specified snow load be less than 1 kPa.

(3) Bow string, arch or semi-circular roof trusses having an unsupported span greater than 6 m shall be designed in conformance with the snow load requirements in Subsection 4.1.6.

9.4.2.3. Platforms Subject to Snow and Occupancy Loads

(1) Balconies, decks and other accessible exterior platforms intended for an *occupancy* and subject to snow loads shall be designed to carry the specified roof snow load or 1.9 kPa, whichever is greater, where the platform, or each segregated area of the platform, serves a single *dwelling unit*.

9.4.2.4. Attics and Roof Spaces

(1) Ceiling joists or truss bottom chords in residential *attic or roof spaces* shall be designed for a total specified load of not less than 0.35 kPa, where the total specified load is the sum of the specified *dead load* plus the specified *live load* of the ceiling and where,

(a) the *attic or roof spaces* have limited accessibility that precludes the storage of equipment or material, and

(b) the maximum attic height is not more than 1 000 mm measured vertically from the top of the truss bottom chord to the underside of the roof deck.

9.4.3. Deflections

9.4.3.1. Deflections

(1) The maximum deflection of structural members shall conform to Table 9.4.3.1.

(2) *Dead loads* need not be considered in computing deflections referred to in Sentence (1).

Table 9.4.3.1.
Maximum Deflections

Forming Part of Sentence 9.4.3.1.(1)

COLUMN 1	COLUMN 2	COLUMN 3
Structural Members	Type of Ceiling Supported	Max. Allowable Deflection as an Expressed Ratio of the Clear Span
Roof rafters, roof joists and roof beams	No ceiling	1/180
	Other than plaster or gypsum board	1/240
	Plaster or gypsum board	1/360

COLUMN 1	COLUMN 2	COLUMN 3
Structural Members	Type of Ceiling Supported	Max. Allowable Deflection as an Expressed Ratio of the Clear Span
Ceiling joists	Other than plaster or gypsum board	1/240
	Plaster or gypsum board	1/360
Floor beams, floor joists and floor decking	All cases	1/360
Beams, joists and decking for balconies, decks and other accessible exterior platforms	Serving a single *dwelling unit*	1/240
	Other	1/360

9.4.4. Foundation Conditions

9.4.4.1. Allowable Bearing Pressures

(1) Footing sizes for *shallow foundations* shall be,

(a) determined in accordance with Section 9.15., or

(b) designed in accordance with Section 4.2. using,

- (i) the maximum *allowable bearing pressures* in Table 9.4.4.1., or
- (ii) *allowable bearing pressures* determined from *subsurface investigation*.

(2) The design procedures described in Section 4.2. are permitted to be used in lieu of the design procedures in this Subsection.

(3) The design procedures described in Section 4.2. shall be used where,

(a) *deep foundations* are used,

(b) the footing size falls outside the scope of this Section, or

(c) the *foundation* is constructed on peat, filled ground or on sensitive clays as described in Article 9.15.1.1.

Table 9.4.4.1.
Allowable Bearing Pressure for Soil or Rock

Forming Part of Sentence 9.4.4.1.(1)

COLUMN 1	COLUMN 2
Type and Condition of *Soil* or *Rock*	Maximum Allowable Bearing Pressure, kPa
Dense or compact sand or gravel	150
Loose sand or gravel	50
Dense or compact silt	100
Stiff clay	150
Firm clay	75
Soft clay	40
Till	200
Clay shale	300
Sound rock	500

9.4.4.2. Foundation Capacity in Weaker Soil and Rock

(1) Where a *soil* or *rock* within a distance equal to twice the footing width below the *bearing surface* has a lower allowable bearing pressure than that at the *bearing surface* as shown in Article 9.4.4.1., the design capacity of the *foundation* shall not be greater than would cause the weakest *soil* or *rock* to be stressed beyond its *allowable bearing pressure*.

(2) In calculating subsurface pressures referred to in Sentence (1), the loads from the footings shall be assumed to be distributed uniformly over a horizontal plane within a frustum extending downward from the footing at an angle of 60° to the horizontal.

9.4.4.3. High Water Table

(1) Where a *foundation* bears on gravel, sand or silt, and the water table is within a distance below the *bearing surface* equal to the width of the *foundation*, the *allowable bearing pressure* shall be 50% of that determined in Article 9.4.4.1.

9.4.4.4. Soil Movement

(1) Where a *foundation* is located in an area where *soil* movement caused by changes in *soil* moisture content, freezing, or chemical-microbiological oxidation is known to occur to the extent that it will damage a *building*, measures shall be taken to preclude such movement or to reduce the effects on the *building* so that the *building's* stability and the performance of assemblies will not be adversely affected.

(2) Any surcharge shall be in addition to the equivalent fluid pressure specified in Sentence (1).

9.4.4.5. Reserved

9.4.4.6. Wall Supporting Drained Earth

(1) Except where constructed in accordance with Section 9.15., walls supporting drained earth shall be designed,

(a) for a pressure equivalent to that exerted by a fluid with a density of not less than 480 kg/m^3 and a depth equal to that of the retained earth, or

(b) in accordance with Section 4.2. so as to be able to resist the loads and effects described in Article 4.1.2.1.

(2) Walls supporting other than drained earth shall be designed,

(a) for the pressure described in Clause 1(a) plus the fluid pressure of the surcharge, or

(b) in accordance with Section 4.2. so as to be able to resist the loads, forces and effects described in Article 4.1.2.1.

Section 9.5. Design of Areas and Spaces

9.5.1. General

9.5.1.1. Application

(1) Unless otherwise specifically indicated, this Section applies only to *dwelling units* that are intended for use on a continuing or year-round basis as the principal residence of the occupant.

9.5.1.2. Method of Measurement

(1) Unless otherwise indicated in this Part, the areas, dimensions and heights of rooms or spaces shall be measured between finished wall surfaces and between finished floor and ceiling surfaces.

9.5.1.3. Floor Areas

(1) Minimum floor areas specified in this Section do not include closets or built-in bedroom cabinets unless otherwise indicated.

9.5.1.4. Combination Rooms

(1) Two or more areas may be considered as a combination room if the opening between the areas occupies the larger of 3 m^2 or 40% or more of the wall measured on the side of the dependent area.

(2) Where the dependent area is a bedroom, direct passage shall be provided between the two areas.

(3) The opening required in Sentence (1) shall not contain doors or windows.

9.5.1.5. Lesser Areas and Dimensions

(1) Areas of rooms and spaces are permitted to be less than required in this Section provided it can be shown that the rooms and spaces are adequate for their intended use, such as by the provision of built-in furniture to compensate for reduced sizes.

9.5.2. Barrier-Free Design

9.5.2.1. General

(1) Except as provided in Sentence (2) and Article 3.8.1.1., every *building* shall be designed in conformance with Section 3.8.

(2) The requirements of Section 3.8. need not be provided for houses including semi-detached houses, duplexes, triplexes, town houses, row houses and *boarding, or rooming houses* with fewer than 8 boarders or roomers.

9.5.2.2. Protection on Floor Areas with a Barrier-Free Path of Travel

(1) Where a *barrier-free* path of travel required in Article 9.5.2.1. is provided to any *storey* above the *first storey*, the requirements in Article 3.3.1.7. shall apply.

9.5.2.3. Stud Wall Reinforcement

(1) If wood wall studs or sheet steel wall studs enclose the main bathroom in a *dwelling unit*, reinforcement shall be installed to permit the future installation of a grab bar on a wall adjacent to,

(a) a water closet in the location required by Clause 3.8.3.8.(1)(d), and

(b) a shower or bathtub in the location required by Clause 3.8.3.13.(1)(f).

9.5.3. Ceiling Heights

9.5.3.1. Ceiling Heights of Rooms or Spaces

(1) The ceiling heights of rooms or spaces in *residential occupancies* and *live/work units* shall conform to Table 9.5.3.1.

(2) Areas in rooms or spaces over which ceiling height is not less than the minimum specified in Table 9.5.3.1. shall be contiguous with the entry or entries to those rooms or spaces.

Table 9.5.3.1.
Room Ceiling Heights

Forming Part of Sentences 9.5.3.1.(1) and (2)

COLUMN 1	COLUMN 2
Room or Space	Minimum Heights(1)
Living room or space, dining room or space, kitchen or kitchen space	2 300 mm over at least 75 per cent of the required floor area with a clear height of 2 100 mm at any point over the required area
Bedroom or bedroom space	2 300 mm over at least 50 per cent of the required area or 2 100 mm over all of the required floor area. Any part of the floor having a clear height of less than 1 400 mm shall not be considered in computing the required floor area.
Basement space	2 100 mm over at least 75 per cent of the *basement* area except that under beams and ducts the clearance is permitted to be reduced to 1 950 mm
Bathroom, water closet room or laundry area above *grade*	2 100 mm in any area where a person would normally be in a standing position
Passage, hall or main entrance vestibule and finished rooms not specifically mentioned above	2 100 mm

Notes to Table 9.5.3.1.:

(1) Area of the space shall be measured at floor level.

9.5.3.2. Mezzanines

(1) The ceiling height above and below a *mezzanine* floor assembly in all *occupancies* shall be not less than 2 100 mm.

9.5.3.3. Storage Garages

(1) The clear height in a *storage garage* shall be not less than 2 000 mm.

9.5.4. Living Rooms or Spaces Within Dwelling Units

9.5.4.1. Areas of Living Rooms and Spaces

(1) Living areas within *dwelling units*, either as separate rooms or in combination with other spaces, shall have an area not less than 13.5 m².

(2) Where the area of a living space is combined with a kitchen and dining area, the living area alone in a *dwelling unit* that contains sleeping accommodation for not more than 2 persons shall be not less than 11 m².

9.5.5. Dining Rooms or Spaces Within Dwelling Units

9.5.5.1. Area of Dining Rooms or Spaces

(1) A dining space in combination with other space shall have an area of not less than 3.25 m².

(2) Dining rooms not combined with other space shall have a minimum area of 7 m².

9.5.6. Kitchens Within Dwelling Units

9.5.6.1. Kitchen Areas

(1) Kitchen areas within *dwelling units* either separate from or in combination with other spaces, shall have an area of not less than 4.2 m² including the area occupied by the base cabinets, except that in *dwelling units* containing sleeping accommodation for not more than 2 persons, the minimum area shall be 3.7 m².

9.5.7. Bedrooms or Spaces in Dwelling Units and Dormitories

9.5.7.1. Areas of Bedrooms

(1) Except as provided in Articles 9.5.7.2. and 9.5.7.3., bedrooms in *dwelling units* shall have an area not less than 7 m² where built-in cabinets are not provided and not less than 6 m² where built-in cabinets are provided.

9.5.7.2. Areas of Master Bedrooms

(1) Except as provided in Article 9.5.7.3., at least one bedroom in every *dwelling unit* shall have an area of not less than 9.8 m² where built-in cabinets are not provided and not less than 8.8 m² where built-in cabinets are provided.

9.5.7.3. Areas of Combination Bedrooms

(1) Bedroom spaces in combination with other spaces in *dwelling units* shall have an area not less than 4.2 m².

9.5.7.4. Areas of Other Sleeping Rooms

(1) Sleeping rooms other than in *dwelling units* shall have an area not less than 7 m² per person for single *occupancy* and 4.6 m² per person for multiple *occupancy*.

9.5.7.5. Recreational Camps

(1) *Recreational camps* shall have an area in the sleeping quarters of at least 3.72 m² per camper or, if double or triple tier bunk units are used, 2.79 m² per camper.

9.5.7.6. Camps for Housing Workers

(1) A *camp for housing of workers* shall have a minimum area of 3.72 m² per employee in every room used for sleeping purposes.

9.5.8. Combined Spaces

9.5.8.1. Combined Living, Dining, Bedroom and Kitchen Spaces

(1) Despite Subsections 9.5.4. to 9.5.7., where living, dining, bedroom and kitchen spaces are combined in a *dwelling unit* that contains sleeping accommodation for not more than 2 persons, the area of the combined spaces shall be not less than 13.5 m².

9.5.9. Bathrooms and Water Closet Rooms

9.5.9.1. Space to Accommodate Fixtures

(1) In every *dwelling unit* an enclosed space of sufficient size shall be provided to accommodate a water closet, lavatory and bathtub or shower stall.

9.5.10. Hallways

9.5.10.1. Width of Hallway Within Dwelling Unit

(1) The unobstructed width of a hallway within a *dwelling unit* shall be not less than 860 mm, except that the hallway width is permitted to be 710 mm where,

(a) there are only bedrooms and bathrooms at the end of the hallway furthest from the living area, and

(b) a second *exit* is provided,

  (i) in the hallway near the end furthest from the living area, or

  (ii) in each bedroom served by the hallway.

Section 9.6. Doors

9.6.1. General

9.6.1.1. Application

(1) This Section applies to doors, to glazed areas in doors and to sidelights for doors.

9.6.2. Required Doors

9.6.2.1. Doors for Dwelling Units

(1) A door shall be provided at each entrance to a *dwelling unit* and to each room containing a water closet within a *dwelling unit*.

9.6.3. Doorway Sizes

9.6.3.1. Doorway Opening Sizes

(1) Except as provided in Articles 9.6.3.3., 9.9.6.2. and 9.9.6.3., doorway openings within dwelling units shall be designed to accommodate at least the door sizes in Table 9.6.3.1. for swing-type doors or folding doors.

Table 9.6.3.1.
Minimum Size of Door

Forming Part of Sentence 9.6.3.1.(1)

COLUMN 1	COLUMN 2	COLUMN 3
At Entrance to:	Minimum Width, mm	Minimum Height, mm
Dwelling unit (required entrance) Vestibule or entrance hall	810	1 980
Stairs to a floor level that contains a finished space All doors in at least one line of passage from the exterior to the *basement* Utility rooms	810	1 980
Walk-in closet	610	1 980
Bathroom, water closet room, shower room(1)	610	1 980
Rooms located off hallways that are permitted to be 710 mm wide	610	1 980
Rooms not mentioned above, exterior balconies	760	1 980

Notes to Table 9.6.3.1.:

(1) See Article 9.6.3.3.

9.6.3.2. Doors to Public Water Closet Rooms

(1) Doors to public water closet rooms shall be not less than 810 mm wide and 2 030 mm high.

9.6.3.3. Doors to Bathrooms

(1) Where a *barrier-free* path of travel conforming to Section 3.8. is provided into a *suite* of *residential occupancy* and where a bathroom within the *suite* is at the level of the *suite* entrance door, the doorway to such bathroom and to each bedroom at the same level as such bathroom shall have, when the door is in the open position, a clear width of not less than,

(a) 760 mm where the door is served by a corridor or space not less than 1 060 mm wide, and

(b) 810 mm where the door is served by a corridor or space less than 1 060 mm wide.

9.6.4. Door Sill Height

9.6.4.1. Height of Door Sills Above Floors or Ground

(1) Doors in *buildings* of *residential occupancy*, where the finished floor on one side of the door is more than 600 mm above the floor or other surface or ground level on the other side of the door, shall be protected by,

(a) a *guard*, in accordance with Subsection 9.8.8., or

(b) a mechanism capable of controlling the free swinging or sliding of the door so as to limit any clear unobstructed opening to not more than 100 mm.

9.6.5. Exterior Doors

9.6.5.1. Exterior Wood Flush Doors

(1) Exterior wood flush doors shall conform to CAN/CSA-O132.2 Series, "Wood Flush Doors".

(2) Each door described in Sentence (1) shall indicate legibly,

(a) the name of the manufacturer,

(b) the standard to which it is produced, and

(c) that it is of an exterior type.

9.6.5.2. Sliding Doors

(1) Sliding doors shall conform to CAN/CGSB-82.1-M, "Sliding Doors".

9.6.5.3. Insulated Steel Doors

(1) Insulated steel doors shall conform to CAN/CGSB-82.5-M, "Insulated Steel Doors".

9.6.5.4. Air Infiltration for Exterior Swing Type Doors

(1) Except where a door is weather-stripped on all edges, and protected with a storm door, or by an enclosed unheated space, an exterior swing type door assemblies shall have a rate of air infiltration not exceeding 1.16 L/s for each metre of crack length when tested at a pressure differential of 75 Pa in conformance with ASTM E283, "Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen".

9.6.5.5. Air Infiltration for Patio Type Sliding Doors

(1) A patio type sliding glass door shall have a rate of air infiltration not exceeding 3.8 L/s for each square metre of door area when tested in conformance with ASTM E283, "Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen".

9.6.5.6. Weather Stripping

(1) In buildings of *residential occupancy* weather stripping shall be provided around all exterior doors except garage doors.

9.6.6. Glass

9.6.6.1. Maximum Area of Glass

(1) The maximum area of individual panes of glass for doors shall conform to Table 9.6.6.1.

Table 9.6.6.1.
Maximum Glass Area for Doors

Forming Part of Sentence 9.6.6.1.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8
Glass Thickness, mm	Maximum Glass Area, m^2						
	Type of Glass						
	Annealed	Annealed Multiple-Glazed Factory-Sealed Units	Laminated	Wired	Heat Strengthened	Fully Tempered	Fully Tempered Multiple-Glazed Factory-Sealed Units
3	0.50	0.70	(1)	(1)	1.00	1.00	2.00
4	1.00	1.50	(1)	(1)	1.50	4.00	4.00
5	1.50	1.50	(1)	(1)	1.50	No Limit	No Limit
6	1.50	1.50	1.20	1.00	1.50	No Limit	No Limit

Notes to Table 9.6.6.1.:

(1) Not generally available.

9.6.6.2. Glass in Doors and Sidelights

(1) Glass in doors and sidelights for doors shall conform to Sentence 9.7.3.1.(1).

(2) Glass in sidelights greater than 500 mm wide that could be mistaken for doors, glass in storm doors and glass in sliding doors within or at every entrance to a *dwelling unit* and in public areas shall be,

(a) safety glass of the tempered or laminated type conforming to CAN/CGSB-12.1-M, "Tempered or Laminated Safety Glass", or

(b) wired glass conforming to CAN/CGSB-12.11-M, "Wired Safety Glass".

(3) Except as provided in Article 9.7.5.2., glass in entrance doors to dwelling units and in public areas other than the entrance door described in Sentence (2), shall be safety glass or wired glass of the type described in Sentence (2) where the glass area exceeds 0.5 m^2 and extends to less than 900 mm from the bottom of the door.

9.6.6.3. Mirrored Glass Doors

(1) Mirrored glass doors are permitted to be used only at the entrance to clothes closets and shall conform to the requirements of CAN/CGSB-82.6-M, "Doors, Mirrored Glass, Sliding or Folding Wardrobe".

(2) Mirrored glass doors reinforced with a film backing shall meet the impact resistance requirements specified in CAN/CGSB-12.5-M, "Mirrors, Silvered".

9.6.6.4. Visibility of Glass or Transparent Doors

(1) Except as provided in Article 9.7.5.2., every glass or transparent door accessible to the public shall be equipped with hardware, bars or other permanent fixtures designed so that the existence and position of such door will be readily apparent.

9.6.6.5. Glass for Shower or Bathtub Enclosures

(1) Glass other than safety glass shall not be used for a shower or bathtub enclosure.

9.6.7. Thermal Breaks

9.6.7.1. Application

(1) This Subsection applies to doors and sidelights separating heated space from unheated space or the exterior.

9.6.7.2. Required Thermal Breaks

(1) Except as provided in Sentence (2), metal frames for doors, for glazing in doors, and for sidelights for doors shall incorporate a thermal break.

(2) Thermal breaks need not be installed in accordance with Sentence (1) where the doors are,

(a) garage doors,

(b) storm doors, or

(c) doors that are required to have a *fire-resistance rating*.

9.6.8. Resistance to Forced Entry

9.6.8.1. Application

(1) Except as permitted in Sentence (2), this Subsection applies to,

(a) swinging entrance doors to *dwelling units*,

(b) swinging doors between *dwelling units* and attached garages or other ancillary spaces, and

(c) swinging doors that provide access directly or indirectly from a *storage garage* to a *dwelling unit*.

(2) Sentence (1) does not apply to exterior doors to garages and to other ancillary spaces.

9.6.8.2. Wood Doors

(1) Except as permitted in Article 9.6.8.10., wood doors as described in Sentence 9.6.8.1.(1) shall,

(a) be solid core or stile and rail type,

(b) be not less than 45 mm thick, and

(c) if of the stile and rail panel type, have a panel thickness of not less than 19 mm, with a total panel area not more than half of the door area.

9.6.8.3. Deadbolt Lock

(1) Except as permitted in Article 9.6.8.10., doors described in Sentence 9.6.8.1.(1) shall be provided with a deadbolt lock with a cylinder having no fewer than 5 pins and a bolt throw not less than 25 mm, protected with a solid or hardened free-turning ring or bevelled cylinder housing.

9.6.8.4. Double Doors

(1) Except as permitted in Article 9.6.8.10., an inactive leaf in double doors used in locations specified in Sentence 9.6.8.1.(1) shall be provided with heavy duty bolts top and bottom having an engagement of not less than 15 mm.

9.6.8.5. Fastening of Hinges

(1) Except as permitted in Article 9.6.8.10., hinges for doors in Sentence 9.6.8.1.(1) shall be fastened to wood doors with wood screws not less than 25 mm long and to wood frames with wood screws such that at least two screws per hinge penetrate not less than 30 mm into solid wood.

(2) Except as permitted in Article 9.6.8.10., hinges for doors in Sentence 9.6.8.1.(1) shall be fastened to metal doors and metal frames with machine screws not smaller than No. 8 and not less than 10 mm long.

9.6.8.6. Fastening of Strikeplates

(1) Except as permitted in Article 9.6.8.10., strikeplates for deadbolts described in Sentence 9.6.8.3.(1) shall be fastened to wood frames with wood screws that penetrate not less than 30 mm into solid wood.

(2) Except as permitted in Article 9.6.8.10., strikeplates for deadbolts in Sentence 9.6.8.3.(1) shall be fastened to metal frames with machine screws not smaller than No. 8 and not less than 10 mm long.

9.6.8.7. Outward Swinging Doors

(1) Except for storm doors or screen doors, doors described in Sentence 9.6.8.1.(1) that swing outward shall be provided with hinges or pins so that the doors cannot be removed when they are in the closed position.

9.6.8.8. Door Viewer

(1) Main entrance doors to *dwelling units* shall be provided with,

(a) a door viewer or transparent glazing in the door, or

(b) a sidelight.

9.6.8.9. Solid Blocking

(1) Solid blocking shall be provided on both sides at the lock height between the jambs for doors described in Sentence 9.6.8.1.(1) and the structural framing so that the jambs will resist spreading by force.

9.6.8.10. Alternate Test Procedure

(1) Doors, frames and hardware that conform to a security level of at least Grade 10 as described in the Annex to ASTM F476, "Security of Swinging Door Assemblies", are not required to conform to Articles 9.6.8.2. to 9.6.8.6.

Section 9.7. Windows and Skylights

9.7.1. General

9.7.1.1. Application

(1) Windows and skylights shall conform to the requirements of this Section.

9.7.1.2. Minimum Window Areas

(1) Except as required in Article 9.7.1.3. and Sentence (3), the minimum window glass area for rooms in *buildings* of *residential occupancy* or that are used for sleeping shall conform to Table 9.7.1.2.

(2) The unobstructed glass area of a door or skylight is considered equivalent to that of a window.

(3) Work areas in *live/work units* shall conform to Clause 3.7.2.1.(2)(a).

(4) Where rooms with different requirements for window glass area are combined as described in Sentence 9.5.1.4.(1), the more restrictive requirement shall govern.

Table 9.7.1.2.
Glass Areas for Rooms of Residential Occupancy

Forming Part of Sentence 9.7.1.2.(1)

COLUMN 1	COLUMN 2	COLUMN 3
Location	Minimum Unobstructed Glass Area With No Electric Lighting	Minimum Unobstructed Glass Area With Electric Lighting
Laundry, *basement* recreation room, unfinished *basement*	4% of area served	Windows not required
Water closet room	0.37 m²	Windows not required
Kitchen, kitchen space, kitchen alcove	10% of area served	Windows not required
Living rooms and dining rooms	10% of area served	10% of area served
Bedrooms and other finished rooms not mentioned above	5% of area served(1)	5% of area served(1)

Notes to Table 9.7.1.2.:

(1) See Article 9.7.1.3.

9.7.1.3. Bedroom Windows

(1) Except where a door on the same floor level as the bedroom provides direct access to the exterior, every floor level containing a bedroom in a *suite* shall be provided with at least 1 outside window that,

(a) is openable from the inside without the use of tools,

(b) provides an individual, unobstructed open portion having a minimum area of 0.35 m² with no dimension less than 380 mm, and

(c) maintains the required opening described in Clause (b) without the need for additional support.

(2) Except for *basement* areas, the window described in Sentence (1) shall have a maximum sill height of 1 000 mm above the floor.

(3) When sliding windows are used, the minimum dimension described in Sentence (1) shall apply to the openable portion of the window.

(4) Where the sleeping area within a *live/work unit* is on a *mezzanine* with no obstructions more than 1 070 mm above the floor, the window required in Sentence (1) may be provided on the main level of the *live/work unit* provided the *mezzanine* is not more than 25% of the area of the *live/work unit* or 20 m² whichever is less and an unobstructed direct path of travel is provided from the *mezzanine* to this window.

9.7.1.4. Window Opening into a Window-Well

(1) Where a window required in Article 9.7.1.3. opens into a window-well, a clearance of not less than 550 mm shall be provided in front of the window.

(2) Where the sash of a window referred to in Sentence (1) swings towards the window-well, the operation of the sash shall not reduce the clearance in a manner that would restrict escape in an emergency.

(3) Where a protective enclosure is installed over the window-well referred to in Sentence (1), such enclosure shall be openable from the inside without the use of keys, tools or special knowledge of the opening mechanism.

9.7.1.5. Termites

(1) In localities where termites are known to occur and where windows or other openings at or below *grade* contain wood elements, the bottom of window wells or adjacent ground shall be at least 150 mm below the nearest wood unless the wood is pressure-treated with a chemical toxic to termites in accordance with Article 9.3.2.9.

9.7.1.6. Height of Window Sills above Floors or Ground

(1) Except as provided in Sentence (2), openable windows in *buildings* of *residential occupancy* shall be protected by,

(a) a *guard* in accordance with Subsection 9.8.8., or

(b) a mechanism capable of controlling the free swinging or sliding of the openable part of the window so as to limit any clear unobstructed opening to not more than 100 mm measured either vertically or horizontally where the other dimension is greater than 380 mm.

(2) Windows need not be protected in accordance with Sentence (1) where,

(a) the window serves a *dwelling unit* that is not located above another *suite*,

(b) the only opening greater than 100 mm by 380 mm is a horizontal opening at the top of the window,

(c) the top surface of the window sill is located more than 480 mm above the finished floor on one side of the window, or

(d) the window is located in a room or space with the finished floor described in Clause (c) located less than 1 800 mm above the floor or ground on the other side of the window.

9.7.1.7. Air Infiltration of Exterior Windows

(1) Air infiltration of exterior windows shall not exceed 0.775 L/s for each metre of sash crack when tested at a pressure differential of 75 Pa in conformance with ASTM E283, "Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen".

9.7.2. Window Standards

9.7.2.1. Window Standard

(1) Windows shall conform to,

(a) CAN/CSA-A440, "Windows", and

(b) the CAN/CSA-A440.1, "User Selection Guide to CSA Standard CAN/CSA-A440-00 Windows".

9.7.3. Glass

9.7.3.1. Glass Standards

(1) Glass shall conform to,

(a) CAN/CGSB-12.1-M, "Tempered or Laminated Safety Glass",

(b) CAN/CGSB-12.2-M, "Flat, Clear Sheet Glass",

(c) CAN/CGSB-12.3-M, "Flat, Clear Float Glass",

(d) CAN/CGSB-12.4-M, "Heat-Absorbing Glass",

(e) CAN/CGSB-12.8, "Insulating Glass Units",

(f) CAN/CGSB-12.10-M, "Glass, Light and Heat/Reflecting",

(g) CAN/CGSB-12.11-M, "Wired Safety Glass", or

(h) ASTM E2190, "Insulating Glass Unit Performance and Evaluation".

9.7.3.2. Structural Design of Glass

(1) Glass in windows, sloped glazing and skylights shall be designed in conformance with CAN/CGSB-12.20-M, "Structural Design of Glass for Buildings".

9.7.4. Caulking and Glazing

9.7.4.1. Sealing Compound

(1) The sealing compound used to seal the glass component of a factory-sealed double-glazed unit to the sash component shall be compatible with the material used to edge seal the glass component.

9.7.4.2. Caulking Compound

(1) Caulking shall be provided between window frames or trim and the exterior siding or masonry in conformance with Subsection 9.27.4.

9.7.5. Protection of Windows in Public Areas

9.7.5.1. Transparent Panels

(1) Except as provided in Article 9.7.5.2., transparent panels that could be mistaken as a *means of egress* shall be protected by barriers or railings.

9.7.5.2. Sliding Glass Partitions

(1) Sliding glass *partitions* that separate a *public corridor* from an adjacent *occupancy* and that are open during working hours need not conform to Article 9.7.5.1. and Sentence 9.6.6.2.(3), except that such *partitions* shall be suitably marked to indicate their existence and position.

9.7.5.3. Windows over Stairs, Ramps and Landings

(1) Except as provided in Sentence (2), windows over stairs, ramps and landings that extend to less than 1 070 mm above the surface to the treads, ramp or landing shall be,

(a) protected by *guards*, in accordance with Subsection 9.8.8., or

(b) non-openable and designed to withstand the specified lateral loads for *guards* as provided in Articles 4.1.5.15. or 9.8.8.2.

(2) In *dwelling units*, windows over stairs, ramps and landings that extend to less than 900 mm above the surface to the treads, ramp or landing shall be,

(a) protected by *guards*, in accordance with Subsection 9.8.8., or

(b) non-openable and designed to withstand the specified lateral loads for *guards* as provided in Articles 4.1.5.15. or 9.8.8.2.

9.7.5.4. Windows above the Second Storey

(1) Windows in public areas that extend to less than 1 000 mm from the floor and are located above the second *storey* in *buildings* of *residential occupancy* shall be,

(a) protected by *guards* in accordance with Subsection 9.8.8., or

(b) non-openable and designed to withstand the lateral design loads for *guards* as provided in Articles 4.1.5.15. or 9.8.8.2.

9.7.6. Resistance to Forced Entry

9.7.6.1. Forced Entry Through Windows

(1) In *dwelling units*, windows, any part of which is located within 2 000 mm of adjacent ground level, shall conform to the requirements for resistance to forced entry as described in Clause 10.13 of CAN/CSA-A440-M, "Windows".

9.7.7. Skylights

9.7.7.1. Plastic Skylights

(1) Plastic skylights shall conform to CAN/CGSB-63.14-M, "Plastic Skylights".

9.7.7.2. Glass Skylights

(1) Factory-built glass skylights shall meet the performance requirements of CAN/CGSB-63.14-M, "Plastic Skylights".

Section 9.8. Stairs, Ramps, Handrails and Guards

9.8.1. Application

9.8.1.1. General

(1) This Section applies to the design and construction of interior and exterior stairs, steps, ramps, railings and *guards*.

9.8.1.2. Exit Stairs, Ramps and Landings

(1) Where a stair, ramp or landing forms part of an *exit*, the appropriate requirements in Sections 9.9. and 9.10. shall also apply.

9.8.1.3. Escalators and Moving Walkways

(1) Escalators and moving walkways shall conform to the appropriate requirements in Part 3.

9.8.2. Stair Dimensions

9.8.2.1. Stair Width

(1) Required *exit* stairs and public stairs shall have a width, measured between wall faces or *guards*, of not less than 900 mm.

(2) At least 1 stair between each floor level within a *dwelling unit*, and exterior stairs serving a single *dwelling unit* except required *exit* stairs, shall have a width of not less than 860 mm.

9.8.2.2. Height over Stairs

(1) The clear height over stairs measured vertically from a line drawn through the leading edges of the treads, shall be not less than,

(a) 1 950 mm for stairs within *dwelling units*, and

(b) 2 050 mm for stairs not within *dwelling units*.

9.8.3. Stair Configurations

9.8.3.1. Straight and Curved Runs in Stairs

(1) Except as provided in Sentence (2), stairs shall consist of,

(a) straight-runs, or

(b) curved-runs.

(2) Stairs within *dwelling units* shall consist of,

(a) straight-runs,

(b) curved-runs,

(c) straight-runs with winders, or

(d) straight-runs with curved-runs.

9.8.3.2 Minimum Number of Risers

(1) Except for stairs within a *dwelling unit*, at least 3 risers shall be provided in interior flights.

9.8.3.3. Maximum Height of Stairs

(1) The vertical height between any landings shall not exceed 3.7 m.

9.8.4. Step Dimensions

9.8.4.1. Uniformity and Tolerances for Risers and Treads

(1) Except as provided in Sentence (2), risers shall have uniform height in any one flight with a maximum tolerance of,

(a) 6 mm between adjacent treads or landings, and

(b) 6 mm between the tallest and shortest risers in a flight.

(2) Except for required *exit* stairs, where the top or bottom riser in a stair adjoins a sloping finished walking surface such as a garage floor, driveway or sidewalk, the height of the riser across the stair shall vary by not more than 1 in 12.

(3) Treads shall have uniform run and tread depth, with a maximum tolerance of,

(a) 6 mm between adjacent treads, and

(b) 6 mm between the deepest and shallowest runs and treads in a flight.

(4) Where angled treads or winders are incorporated into a stair, the treads in all sets of angled treads or winders within a flight shall turn in the same direction.

(5) Cross-slope of treads shall not exceed 1 in 100.

9.8.4.2. Dimensions for Risers

(1) Risers shall conform to Table 9.8.4.2.

Table 9.8.4.2.
Riser Height, Run and Tread Depth for Rectangular Treads

Forming Part of Sentences 9.8.4.2.(1) and 9.8.4.3.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7
Stair Type	All Steps		Rectangular Treads			
	Rise, mm		Run, mm		Tread Depth, mm	
	max.	min.	max.	min.	max.	min.
Service and *mezzanines* in *live/work units*[1]	no limit	125	355	no limit	355	no limit
Private[2]	200	125	355	210	355	235
Public[3]	200	125	355	230	355	250

Notes to Table 9.8.4.2.:

(1) Service stairs serve areas used only as *service rooms* or *service spaces* and stairs that serve *mezzanines* not exceeding 20 m^2 within *live/work units.*

(2) Private stairs are interior stairs within *dwelling units* and exterior stairs serving a single *dwelling unit.*

(3) Public stairs are all stairs not described as service stair or private stairs.

9.8.4.3. Dimensions for Rectangular Treads

(1) The run and tread depth of rectangular treads shall conform to Table 9.8.4.2.

(2) The depth of a rectangular tread shall be not less than its run and not more that its run plus 25 mm.

9.8.4.4. Dimensions for Angled Treads

(1) Angled treads in required *exit* stairs shall comply with Article 3.4.6.8.

(2) Except as provided in Article 9.8.4.5., angled treads in other than required *exit* stairs shall have an average run of not less than 200 mm and a minimum run of 150 mm.

(3) The depth of an angled tread shall be not less than its run at any point and not more than its run plus 25 mm.

9.8.4.5. Winders

(1) Stairs within *dwelling units* are permitted to contain winders that converge to a centre point provided,

(a) the winders turn through an angle of not more than 90°,

(b) individual treads turn through an angle of not less than 30° or not more than 45°, and

(c) adjacent winders turn through the same angle.

(2) Where more than one set of winders described in Sentence (1) is provided in a single stairway between adjacent floor levels, such winders shall be separated in plan by at least 1 200 mm.

9.8.4.6. Leading Edges of Treads

(1) Leading edges of treads that are bevelled or rounded shall,

(a) not reduce the required tread depth by more than 15 mm, and

(b) not, in any case, exceed 25 mm horizontally.

9.8.4.7. Interior Stairs Extending Through the Roof

(1) Interior stairways extending through the roof of a *building* shall be protected from ice and snow.

9.8.5. Ramps

9.8.5.1. Application

(1) This Subsection applies to pedestrian ramps except ramps in a *barrier-free* path of travel.

(2) Ramps in a *barrier-free* path of travel shall conform to the requirements in Article 3.8.3.4.

9.8.5.2. Ramp Width

(1) Except for required *exit* ramps, public ramps shall have a width of not less than 900 mm.

(2) Ramps within *dwelling units*, and exterior ramps serving a single *dwelling unit* except required *exit* ramps, shall have a width of not less than 860 mm.

9.8.5.3. Height over Ramps

(1) The clear height over ramps shall be not less than,

(a) 1 950 mm for ramps within *dwelling units*, and

(b) 2 050 mm for ramps not within *dwelling units*.

9.8.5.4. Slope

(1) The slope of ramps shall be not more than,

(a) 1 in 10 for exterior ramps,

(b) 1 in 10 for interior ramps serving *residential occupancies*,

(c) 1 in 6 for *mercantile* or *industrial occupancies*, and

(d) 1 in 8 for all other *occupancies*.

9.8.5.5. Maximum Rise

(1) Where the slope of the ramp is greater than 1 in 12, the maximum rise between floors or landings shall be 1 500 mm.

9.8.6. Landings

9.8.6.1. Application

(1) This Subsection applies to landings, except landings for ramps in a *barrier-free* path of travel.

(2) Landings for ramps in a *barrier-free* path of travel shall conform to the requirements in Article 3.8.3.4.

(3) Finished floors, and ground surfaces with a slope not exceeding 1 in 100, at the top and bottom of stairs or ramps shall be considered as landings.

9.8.6.2. Required Landings

(1) Except as provided in Sentences (2) to (4) and Sentence 9.9.6.6.(2), a landing shall be provided,

(a) at the top and bottom of each flight of interior and exterior stairs, including stairs in garages,

(b) at the top and bottom of every ramp with a slope greater than 1 in 50, and

(c) where a doorway opens onto a stair or ramp.

(2) Where a door at the top of a stair in a *dwelling unit* swings away from the stair, no landing is required between the doorway and the stair.

(3) Except for an entrance from an attached garage, a landing may be omitted at the top of an exterior stair serving a secondary entrance to a single *dwelling unit*, provided,

(a) the stair does not contain more than 3 risers,

(b) except as provided in Clause (c), the door is a sliding door or swings away from the stair, and

(c) where a storm or screen door is provided, it may swing over the stair if it is equipped with hardware to hold it open.

(4) A landing may be omitted at the bottom of an exterior stair or ramp provided there is no obstruction, such as a gate or door, within the lesser of the width of the stair or ramp or,

(a) 900 mm for stairs or ramps serving a single *dwelling unit*, and

(b) 1100 mm for stairs or ramps not serving a single *dwelling unit*.

9.8.6.3. Dimensions of Landings

(1) Except as provided in Sentences (2) to (4), the width and length of landings shall comply with Table 9.8.6.3.

(2) Where stairs or ramps of different widths adjoin a single landing, the width of the landing shall be,

(a) not less than the greater required stair or ramp width where one or more of the stair or ramp widths do not exceed their respective required widths, or

(b) not less than the lesser actual stair or ramp width where all of the widths of the stairs or ramps exceed their respective required widths.

(3) Where a door swings toward a stair, the full arc of the swing shall be over the landing.

(4) Where a doorway or stairway opens onto the side of a ramp, the landing shall extend for a distance of not less than 300 mm on either side of the doorway or stairway, except on a side abutting an end wall.

Table 9.8.6.3.
Dimensions of Landings

Forming Part of Sentence 9.8.6.3.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
Application	Landing Configuration	Minimum Width, mm	Length, mm
Stairs and ramps serving a single *dwelling unit*	In straight-run stair or ramp, or landing turning through less than 30°, within a *dwelling unit*	Width of stair or ramp	Not less than 860
	In straight-run exterior stair or ramp, or exterior landing turning through less than 30°	Width of stair or ramp	Not less than 900
	Landing turning through an angle of 30° or more, but less than 90°	Width of stair or ramp measured at right angle to path of travel	(a) Not less than 230 measured at the inside edge of the landing, and (b) Not less than 370 measured 230 mm from the inside edge of landing or handrail
	Landing turning through not less than 90°	Width of stair or ramp measured at right angle to path of travel	Not less than width of landing
Stairs and ramps serving other than single *dwelling units*	In straight-run stair or ramp, or landing turning through less than 30°	Width of stair or ramp	Lesser of required width of stair or ramp, or 1 100
	Landing turning through 30° or more	Width of stair or ramp measured at right angle to path of travel	Not less than width of stair or landing

9.8.6.4. Height over Landings

(1) The clear height over landings shall be not less than,

(a) 1 950 mm for landings within *dwelling units*, and

(b) 2 050 mm for landings not within *dwelling units*.

9.8.7. Handrails

9.8.7.1. Required Handrails

(1) Except as permitted in Sentences (2) and (3), a handrail shall be provided,

(a) on at least one side of stairs or ramps less than 1 100 mm in width,

(b) on 2 sides of curved stairs or ramps of any width, except curved stairs within *dwelling units*, and

(c) on 2 sides of stairs or ramps 1 100 mm in width or greater.

(2) Handrails are not required for,

(a) interior stairs having not more than 2 risers and serving a single *dwelling unit*,

(b) exterior stairs having not more than 3 risers and serving a single *dwelling unit*,

(c) ramps with a slope of not less than 1 in 12, or

(d) ramps rising not more than 400 mm.

(3) Only one handrail is required on exterior stairs having more than 3 risers provided such stairs serve a single *dwelling unit*.

9.8.7.2. Continuity of Handrails

(1) Except as provided in Sentence (2), at least one required handrail shall be continuous throughout the length of the stair or ramp, including landings, except where interrupted by,

(a) doorways, or

(b) newel posts at changes in direction.

(2) For stairs or ramps serving a single *dwelling unit*, at least one handrail shall be continuous throughout the length of the stair or ramp, except where interrupted by,

(a) doorways,

(b) landings, or

(c) newel posts at changes in direction.

9.8.7.3. Termination of Handrails

(1) Handrails shall be terminated in a manner that will not obstruct pedestrian travel or create a hazard.

(2) Except for stairs and ramps serving a single *dwelling unit*, at least one handrail at the sides of a stair or ramp shall extend horizontally not less than 300 mm beyond the top and bottom of each stair or ramp.

9.8.7.4. Height of Handrails

(1) The height of handrails on stairs and ramps shall be measured vertically from the top of the handrail to,

(a) a line drawn through the leading edge of the stair treads served by the handrail, or

(b) the surface of the ramp, floor or landing served by the handrail.

(2) Except as provided in Sentence (3), the height of handrails on stairs and ramps shall be,

(a) not less than 800 mm, and

(b) not more than 965 mm.

(3) Where *guards* are required, handrails required on landings shall be not more than 1 070 mm in height.

9.8.7.5. Ergonomic Design

(1) A clearance of not less than 50 mm shall be provided between a handrail and any surface behind it.

(2) All handrails shall be constructed so as to be continually graspable along their entire length with no obstruction on or above them to break a handhold, except where the handrail is interrupted by newels at changes in direction.

9.8.7.6. Projections into Stairs and Ramps

(1) Handrails and projections below handrails, including handrail supports and stair stringers shall not project more than 100 mm into the required width of a stair or ramp.

9.8.7.7. Design and Attachment of Handrails

(1) Handrails and any *building* element that could be used as a handrail shall be designed and attached in such a manner to resist,

(a) a concentrated load at any point of not less than 0.9 kN, and

(b) for handrails other than those serving a single *dwelling unit*, a uniformly distributed load of 0.7 kN/m.

(2) Where a handrail serving a single *dwelling unit* is attached to wood studs or blocking, the attachment shall be deemed to comply with Sentence (1) where,

(a) the attachment points are spaced not more than 1.2 m apart,

(b) the first attachment point at either end is located not more than 300 mm from the end of the handrail, and

(c) the fasteners consist of no fewer than 2 wood screws at each point, penetrating not less than 32 mm into solid wood.

9.8.8. Guards

9.8.8.1. Required Guards

(1) Except as provided in Sentences (2) and (3), every surface to which access is provided for other than maintenance purposes, including but not limited to flights of steps and ramps, exterior landings, porches, balconies, *mezzanines*, galleries and raised walkways, shall be protected by a *guard* on each side that is not protected by a wall for the length where,

(a) there is a difference in elevation of more than 600 mm between the walking surface and the adjacent surface, or

(b) the adjacent surface within 1.2 m from the walking surface has a slope of more than 1 in 2.

(2) *Guards* are not required,

(a) at loading docks,

(b) at floor pits in *repair garages*, or

(c) where access is provided for maintenance purposes only.

(3) When an interior stair has more than 2 risers or an interior ramp rises more than 400 mm, the sides of the stair or ramp and the landing or floor level around the stairwell or ramp shall be protected by a *guard* on each side that is not protected by a wall.

9.8.8.2. Loads on Guards

(1) Except as provided in Sentence (5), *guards* shall be designed to resist the loads specified in Table 9.8.8.2.

(2) Where the width and spacing of balusters in *guards* within *dwelling units*, and exterior *guards* serving not more than 2 *dwelling units* is such that 3 balusters can be engaged by a load imposed over the 300 mm width, the load shall be imposed so as to engage 3 balusters.

(3) None of the loads specified in Table 9.8.8.2. need be considered to act simultaneously.

(4) For *guards* within *dwelling units* and for exterior *guards* serving not more than 2 *dwelling units*, Table 9.8.8.2. need not apply where the *guard* construction has been demonstrated to provide effective performance.

(5) *Guards* constructed in accordance with the requirements in Supplementary Standard SB-7 shall be deemed to satisfy the requirements of Sentence (1).

Table 9.8.8.2.
Specified Loads for Guards

Forming Part of Sentence 9.8.8.2.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
Location of *Guard*	Minimum Design Loads		
	Horizontal Load Applied Inward or Outward at any Point at the Top of the *Guard*	Horizontal Load Applied Inward or Outward on Elements Within the *Guard*, Including Solid Panels and Pickets	Evenly Distributed Vertical Load Applied at the Top of the *Guard*
Guards within *dwelling units* and exterior *guards* serving not more than 2 *dwelling units*	0.5 kN/m or concentrated load of 1.0 kN applied at any point(1)	0.5 kN applied over a maximum width of 300 mm and a height of 300 mm(2)	1.5 kN/m
Guards serving access walkways to equipment platforms, contiguous stairs and similar areas	Concentrated load of 1.0 kN applied at any point	Concentrated load of 0.5 kN applied at any point on individual elements	1.5 kN/m
All other *guards*	0.75 kN/m or concentrated load of 1.0 kN applied at any point(1)	Concentrated load of 0.5 kN applied at any point on individual elements	1.5 kN/m

Notes to Table 9.8.8.2.:

(1) The load that creates the most critical condition shall apply.

(2) See Sentence (2).

9.8.8.3. Height of Guards

(1) Except as provided in Sentences (2) to (4), all *guards* shall be not less than 1 070 mm high.

(2) All *guards* within *dwelling units* shall be not less than 900 mm high.

(3) Exterior *guards* serving not more than one *dwelling unit* shall be not less than 900 mm high where the walking surface served by the *guard* is not more than 1 800 mm above the finished ground level.

(4) *Guards* for flights of steps, except in required *exit* stairs, shall be not less than 900 mm high.

(5) The height of *guards* for flights of steps shall be measured vertically from a line drawn through the leading edge of the treads served by the *guard*.

9.8.8.4. Guards for Floors and Ramps in Garages

(1) Except for floors of garages referred to in Section 9.35., where garage floors or ramps are 600 mm or more above the adjacent ground or floor level, every opening through a garage floor and the perimeter of floors and ramps that have no exterior walls shall be provided with,

(a) a continuous curb not less than 150 mm in height, and

(b) a *guard* not less than 1 070 mm above the floor level.

9.8.8.5. Openings in Guards

(1) Except as provided in Sentence (2), openings through any *guard* that is required by Article 9.8.8.1. shall be of a size that will prevent the passage of a spherical object having a diameter of 100 mm unless it can be shown that the location and size of openings that exceed this limit do not represent a hazard.

(2) Openings through any *guard* that is required by Article 9.8.8.1. and that is installed in a *building* of *industrial occupancy* shall be of a size that will prevent the passage of a spherical object having a diameter of 200 mm unless it can be shown that the location and size of such openings that exceed this limit do not represent a hazard.

(3) Unless it can be shown that the location and size of openings that do not comply with the following limits do not represent a hazard, openings through any *guard* that is not required by Article 9.8.8.1. and that serves a *building* of other than *industrial occupancy*, shall be of a size that,

(a) will prevent the passage of a spherical object having a diameter of 100 mm, or

(b) will permit the passage of a spherical object having a diameter of 200 mm.

9.8.8.6. Design to Prevent Climbing

(1) *Guards* required by Article 9.8.8.1., except those in *industrial occupancies* and where it can be shown that the location and size of openings do not represent a hazard, shall be designed so that no member, attachment or opening will facilitate climbing.

(2) *Guards* shall be deemed to comply with Sentence (1) where any elements protruding from the vertical and located within the area between 140 mm and 900 mm above the floor or walking surface protected by the *guard*,

(a) are located more than 450 mm horizontally and vertically from each other,

(b) provide not more than 15 mm horizontal offset,

(c) do not provide a toe-space more than 45 mm horizontally and 20 mm vertically, or

(d) present more than a 1-in-2 slope on the offset.

9.8.8.7. Glass in Guards

(1) Glass in *guards* shall be,

(a) safety glass of the laminated or tempered type conforming to CAN/CGSB-12.1-M, "Tempered or Laminated Safety Glass", or

(b) wired glass conforming to CAN/CGSB-12.11-M, "Wired Safety Glass".

9.8.9. Construction

9.8.9.1. Loads on Stairs and Ramps

(1) Except as required in Articles 9.8.9.4. and 9.8.9.5., stairs and ramps shall be designed for strength and rigidity under uniform loading criteria to support specified loads of,

(a) 1.9 kPa for stairs and ramps serving a single *dwelling unit*, and

(b) 4.8 kPa for other stairs and ramps.

9.8.9.2. Exterior Concrete Stairs

(1) Exterior concrete stairs with more than 2 risers and 2 treads shall be,

(a) supported on unit masonry or concrete walls or piers not less than 150 mm in cross section, or

(b) cantilevered from the main *foundation* wall.

(2) Stairs described in Sentence (1), when cantilevered from the *foundation* wall, shall be constructed and installed in conformance with Subsection 9.8.10.

(3) The depth below ground level for *foundations* for exterior steps shall conform to the requirements in Section 9.12.

9.8.9.3. Exterior Wood Steps

(1) Exterior wood steps shall not be in direct contact with the ground unless suitably treated with a wood preservative.

9.8.9.4. Wooden Stair Stringers

(1) Wooden stair stringers shall,

(a) have a minimum effective depth of 90 mm, measured perpendicularly to the bottom of the stringer at the point of minimum cross-section, and an over-all depth of not less than 235 mm,

(b) be supported and secured top and bottom,

(c) be not less than 25 mm actual thickness if supported along their length and 38 mm actual thickness if unsupported along their length, and

(d) except as permitted in Sentence (2), be spaced not more than 900 mm o.c. for stairs serving not more than one *dwelling unit*, and 600 mm o.c. in other stairs.

(2) For stairs serving not more than one *dwelling unit* where risers support the front portion of the tread, the space between stringers shall be not more than 1 200 mm.

9.8.9.5. Treads

(1) Stair treads of lumber, plywood or O-2 grade OSB within *dwelling units* shall be not less than 25 mm actual thickness, except that if open risers are used and the distance between stringers exceeds 750 mm, the treads shall be not less than 38 mm actual thickness.

(2) Stair treads of plywood or OSB, that are not continuously supported by the riser shall have their face grain or direction of face orientation at right angles to the stringers.

9.8.9.6. Finish for Treads, Landings and Ramps

(1) Except as required in Sentence (4), the finish for treads, landings and ramps shall be,

(a) wear resistant,

(b) slip resistant, and

(c) smooth, even, and free from open defects.

(2) The finish for treads and landings of interior stairs in *dwelling units*, including those from an attached garage serving a single *dwelling unit*, shall be deemed to comply with Sentence (1) where these treads, landings, or ramps are finished with,

(a) hardwood,

(b) vertical grain softwood,

(c) resilient flooring,

(d) low-pile carpet,

(e) mat finish ceramic tile,

(f) concrete, or

(g) for stairs to unfinished *basements* and to garages, plywood.

(3) Stairs and ramps, except those serving a single *dwelling unit* or *service rooms* or *spaces*, shall have either a colour contrast or a distinctive pattern to demarcate,

(a) the leading edge of the treads,

(b) the leading edge of the landing, and

(c) the beginning and end of a ramp.

(4) Treads and landings of interior and exterior stairs and ramps, other than those within *dwelling units*, shall have a slip-resistant finish or be provided with slip-resistant strips that extend not more than 1 mm above the surface.

9.8.10. Cantilevered Precast Concrete Steps

9.8.10.1. Design

(1) Exterior concrete steps and their anchorage system that are cantilevered from a *foundation* wall shall be designed and installed to support the loads to which they may be subjected.

9.8.10.2. Anchorage

(1) Cantilevered concrete steps in Article 9.8.10.1. shall be anchored to concrete *foundation* walls at least 200 mm thick.

9.8.10.3. Prevention of Damage Due to Frost

(1) Suitable precautions shall be taken during backfilling and grading operations to ensure that subsequent freezing of the *soil* will not cause uplift forces on the underside of cantilevered concrete steps to the extent that the steps or the walls to which they are attached will be damaged.

Section 9.9. Means of Egress

9.9.1. Scope

9.9.1.1. Application

(1) Stairways, handrails and *guards* in a *means of egress* shall conform to the requirements in Section 9.8. as well as to the requirements in this Section.

9.9.1.2. Fire Protection

(1) In addition to the fire protection requirements provided in Subsection 9.9.4., *flame-spread ratings*, *fire-resistance ratings* and *fire-protection ratings* for *means of egress* shall conform to Section 9.10.

9.9.1.3. Occupant Load

(1) The *occupant load* of a *floor area* or part of a *floor area*, or of a *building* or part of a *building* not having a *floor area*, shall be based on,

(a) 2 persons per sleeping room or sleeping area in a *dwelling unit* or *suite*, and

(b) for *occupancies* other than as described in Clause (a), the number of persons,

  (i) for which the area is designed, or

  (ii) determined from Table 3.1.17.1.

9.9.2. Types and Purpose of Exits

9.9.2.1. Types of Exits

(1) Except as otherwise provided in this Section, an *exit* from any *floor area* shall be one of the following used singly or in combination:

(a) an exterior doorway,

(b) an exterior passageway,

(c) an exterior ramp,

(d) an exterior stairway,

(e) a fire escape (as described in Subsection 3.4.7.),

(f) a *horizontal exit*,

(g) an interior passageway,

(h) an interior ramp, or

(i) an interior stairway.

(2) Fire escapes are permitted to be used as *exits* on existing *buildings* provided they are designed and installed in conformance with Subsection 3.4.7.

(3) Fire escapes shall not be installed on any new *building*.

(4) Where a *horizontal exit* is used, it shall conform to Sentence 3.4.1.6.(1) and Article 3.4.6.9.

9.9.2.2. Purpose of Exits

(1) An *exit* shall be designed for no purpose other than for exiting except that an *exit* may also serve as an access to a *floor area*.

9.9.2.3. Elevators, Slide Escapes and Windows as Means of Egress

(1) Elevators, slide escapes or windows shall not be considered as part of a required *means of egress*.

(2) Except for *floor areas* of *mercantile occupancy*, casement windows not less than 1 060 mm high, 560 mm wide, with a sill height not more than 900 mm above the inside floor, are permitted to be considered part of a required *means of egress* to provide access to fire escapes, when fire escapes are permitted.

9.9.2.4. Principal Entrances

(1) Except for doors serving a single *dwelling unit*, at least one door at every principal entrance to a *building* providing access from the exterior at ground level shall be designed in accordance with the requirements for *exits*.

9.9.2.5. Front Edge of Stair Treads

(1) Except for curved stairs the front edge of stair treads in *exits* and *access to exits* shall be at right angles to the direction of *exit* travel.

9.9.2.6. Exterior Exit Stairs that Serve a Hotel

(1) Treads and landings of exterior *exit* stairs that serve a *hotel* shall be designed to be free from ice and snow accumulation.

9.9.3. Dimensions of Means of Egress

9.9.3.1. Application

(1) This Subsection applies to every *means of egress* except *exits* that serve not more than one *dwelling unit* and *access to exits* within *dwelling units*.

9.9.3.2. Exit Width

(1) Except for doors and corridors, the width of every *exit* facility shall be not less than 900 mm.

9.9.3.3. Width of Corridors

(1) The width of every *public corridor*, corridor used by the public, and *exit* corridor shall be not less than 1 100 mm.

9.9.3.4. Clear Height

(1) Except for stairways, doorways and *storage garages*, the minimum clear height in *exits* and *access to exits* shall be 2 100 mm.

(2) The clear height in *exits* and *access to exits* in a *storage garage* shall be not less than 2 000 mm.

9.9.4. Fire Protection of Exits

9.9.4.1. Application

(1) Except as provided in Article 9.9.4.4., this Subsection applies to the fire protection of all *exits* except *exits* serving a single *dwelling unit*.

9.9.4.2. Fire Separation for Exits

(1) Except as provided in Sentence (5) and Article 9.9.8.5., every *exit* other than an *exit* doorway, shall be separated from each adjacent *floor area* or from another *exit* by a *fire separation* having a *fire-resistance rating* not less than that required for the floor assembly above the *floor area*.

(2) Where there is no floor assembly above, the *fire-resistance rating* required in Sentence (1) shall not be less than that required by Subsection 9.10.8. for the floor assembly below, but in no case shall the *fire-resistance rating* be less than 45 min.

(3) A *fire separation* common to 2 *exits* shall be smoke-tight and not be pierced by doorways, duct work, piping or any other opening that may affect the continuity of the separation.

(4) A *fire separation* that separates an *exit* from the remainder of the *building* shall have no openings except those for electrical wiring, *noncombustible* conduit and *noncombustible* piping that serve only the *exit* and for standpipes, sprinkler piping, *exit* doorways and wired glass and glass block permitted in Article 9.9.4.3.

(5) The requirements in Sentence (1) do not apply to an exterior *exit* passageway provided the passageway has at least 50 per cent of its exterior sides open to the outdoors and is served by an *exit* stair at each end of the passageway.

9.9.4.3. Wired Glass or Glass Block

(1) This Article applies to wired glass in doors, and wired glass or glass block in sidelights, where these are installed in *fire separations* between *exit* enclosures and *floor areas*.

(2) Except as provided in Sentence (3), the combined area of glazing in doors and sidelights shall not exceed 0.8 m².

(3) Where an *exit* enclosure connects with a *floor area* through an enclosed vestibule or corridor separated from the *floor area* by *fire separations* having not less than a 45 min *fire-resistance rating*, the glazed areas described in Sentence (1) need not be limited as required in Sentence (2).

9.9.4.4. Openings Near Unenclosed Exit Stairs and Ramps

(1) Where an unenclosed exterior *exit* stair or ramp provides the only *means of egress* from a *suite*, and is exposed to fire from openings in the exterior walls of another *fire compartment*, the openings in the exterior walls of the *building* shall be protected with wired glass in fixed steel frames or glass block conforming to Articles 9.10.13.5. and 9.10.13.7. when the openings in the exterior walls of the *building* are within 3 m horizontally and less than 10 m below or less than 5 m above the *exit* stair or ramp.

9.9.4.5. Openings in Exterior Walls of Exits

(1) Either openings in the exterior walls of an *exit* or openings in adjacent exterior walls of the *building* the *exit* serves shall be protected with wired glass in fixed steel frames or glass block installed in accordance with Articles 9.10.13.5. and 9.10.13.7., where,

(a) the *exit* enclosure has exterior walls that intersect the exterior walls of the *building* at an angle of less than 135° measured on the outside of the *building*, and

(b) the openings in the exterior walls of the *building* are within 3 m horizontally and less than 2 000 mm above the openings in the exterior walls of the *exit*.

9.9.4.6. Openings Near Exit Doors

(1) This Article applies to,

(a) *exit* doors serving other than single *dwelling units*, and

(b) *exit* doors serving single *dwelling units* where there is no second and separate *exit* from the *dwelling unit*.

(2) Where an exterior *exit* door described in Sentence (1) in one *fire compartment* is within 3 m horizontally of an *unprotected opening* in another *fire compartment* and the exterior walls of these *fire compartments* intersect at an exterior angle of less than 135°, the opening shall be protected with wired glass in fixed steel frames or glass block conforming to Articles 9.10.13.5. and 9.10.13.7. or with a rated *closure* conforming to Table 9.10.13.1. with respect to the rating of the *fire separation* between the two compartments.

9.9.4.7. Stairways in Group D or E Buildings

(1) Notwithstanding the requirements of Sentences 9.9.4.2.(1), 9.9.8.2.(1) and Article 9.10.9.5., where a *suite* of Group D or E *occupancy* is located partly on the *first storey* and partly on the second *storey* or partly on the second *storey* and partly on the third *storey*, stairways serving that *suite* need not be constructed as *exit* stairs provided,

(a) the *building* is not greater than 3 *storeys* in *building height*,

(b) the *suite* is separated from other *occupancies* by at least a 45 min *fire separation*,

(c) the area occupied by the *suite* is not greater than 100 m^2 per *storey*, other than the *exit* level *storey*,

(d) the maximum travel distance from any point in the *suite* to an exterior *exit* is not greater than 25 m,

(e) the floor assemblies have a *fire-resistance rating* of not less than 45 min or are of *noncombustible construction*,

(f) the *basement* and *first storey* are separated by a *fire separation* having a *fire-resistance rating* of not less than 45 min, and

(g) a *smoke alarm* is installed on each floor of the *suite*, including the *basement*, in accordance with Subsection 9.10.19.

(2) The requirements of Article 9.10.12.1., for separation of exterior openings, do not apply to an occupancy conforming with Sentence (1).

9.9.5. Obstructions and Hazards in Means of Egress

9.9.5.1. Application

(1) This Subsection applies to obstructions and hazards in every *means of egress* except those within a *dwelling unit* or serving a single *dwelling unit*.

9.9.5.2. Occupancies in Corridors

(1) Where a corridor contains an *occupancy*, the *occupancy* shall not reduce the unobstructed width of the corridor to less than the required width of the corridor.

9.9.5.3. Obstructions in Public Corridors

(1) Except as permitted in Sentence (2), obstructions located within 1 980 mm of the floor shall not project horizontally more than 100 mm into *exit* passageways, corridors used by the public or *public corridors* in a manner that would create a hazard for visually impaired persons travelling adjacent to walls.

(2) The horizontal projection of an obstruction in Sentence (1) is permitted to exceed 100 mm where the obstruction extends to less than 680 mm above the floor.

9.9.5.4. Obstructions in Exits

(1) Except as permitted in Subsection 9.9.6. and Article 9.8.7.6., no fixture, turnstile or construction shall project within the required width of an *exit*.

9.9.5.5. Obstructions in Means of Egress

(1) No obstructions such as posts or turnstiles shall be placed so as to restrict the width of a required *means of egress* from a *floor area* or part of a *floor area* to less than 750 mm unless an alternate unobstructed *means of egress* is provided adjacent to and plainly visible from the restricted egress.

(2) Except as provided in Sentence (3), no obstructions, such as counter gates, that do not meet the requirements for *exit* doors, shall be placed in a required *means of egress* from a *floor area* or part of a *floor area* unless an alternate unobstructed *means of egress* is provided adjacent to and plainly visible from the restricted egress.

(3) Obstructions, such as counter gates, that do not satisfy Sentence (2), are permitted to be placed in a required *means of egress* from a part of a *floor area* in *mercantile occupancies* and *business and personal services occupancies*, provided that the part of the *floor area* served by the unobstructed *means of egress* is not generally accessible to the public.

9.9.5.6. Mirrors or Draperies

(1) No mirror shall be placed in or adjacent to any *exit* so as to confuse the direction of *exit*, and no mirror or draperies shall be placed on or over *exit* doors.

9.9.5.7. Fuel-Fired Appliances

(1) Fuel-fired *appliances* shall not be installed in an *exit* or corridor serving as an *access to exit*.

9.9.5.8. Service Rooms

(1) *Service rooms* containing equipment subject to possible explosion, such as *boilers* designed to operate at a pressure in excess of 100 kPa, and certain types of refrigerating and transformer equipment, shall not be located under required *exits*.

9.9.5.9. Ancillary Rooms

(1) Ancillary rooms such as storage rooms, washrooms, toilet rooms, laundry rooms and *service rooms* shall not open directly into an *exit*.

9.9.6. Doors in a Means of Egress

9.9.6.1. Obstructions by Doors

(1) Except as provided in Sentence (4), swinging doors in their swing shall conform to Sentences (2) and (3),

(a) at *exit* doors,

(b) at doors that open into or are located within a *public corridor*, and

(c) at doors that open into or are located within another facility that provides *access to exit* from a *suite*.

(2) When fully open, doors described in Sentence (1) shall not decrease the required *exit* width by more than,

(a) 100 mm in *exit* corridors, and

(b) 50 mm for other *exit* facilities.

(3) The swing of doors described in Sentence (1), shall not reduce the width of the path of travel to less than,

(a) the required *exit* width in *exit* corridors and passageways, and

(b) 750 mm on *exit* stairs or landings.

(4) Doors serving a single *dwelling unit* need not comply with Sentences (2) and (3).

9.9.6.2. Clear Opening Height at Doorways

(1) Except as provided in Sentences (2) and (3), the clear opening height of doorways shall be not less than 2 030 mm high at,

(a) *exit* doors,

(b) doors that open into or are located within a *public corridor*, and

(c) doors that open into or are located within another facility that provides *access to exit* from a *suite*.

(2) The clear opening height under door closers and other devices in doorways described in Sentence (1) shall be not less than 1 980 mm.

(3) Doorways serving a single *dwelling unit* need not comply with Sentences (1) and (2).

9.9.6.3. Clear Opening Width at Doorways

(1) Except as provided in Sentence (4), the clear opening width of doorways shall comply with Sentence (2) at,

(a) *exit* doors, and

(b) doors that open into or are located within a *public corridor*, or

(c) doors that open into or are located within another facility that provides *access to exit* from a *suite*.

(2) Doorways described in Sentence (1) shall be not less than,

(a) 800 mm wide where there is only one door leaf,

(b) 800 mm wide where multiple-leaf doors are installed with only one active leaf with a latching mechanism described in Article 9.9.6.7, and

(c) 1210 mm wide where multiple-leaf doors are installed with two active leaves.

(3) In doorways described in Sentence (1) that have multiple-leaf doors installed,

(a) no active leaf shall be less than 810 mm wide where only one leaf is active, and

(b) no single leaf shall be less than 610 mm wide where two leaves are active.

(4) Doorways serving a single *dwelling unit* need not comply with Sentence (2).

9.9.6.4. Door Action

(1) Except as provided in Sentences (4) and (5), required *exit* doors and doors in required *means of egress*, except doors in *means of egress* within *dwelling units*, shall swing on the vertical axis.

(2) Except as provided in Sentence (5), breakaway sliding doors, installed as required *exit* doors or required doors in *means of egress*, shall be identified as swinging doors by means of a label or decal affixed to the door.

(3) Revolving doors shall comply with Article 3.4.6.14.

(4) Movable *partitions* used to separate a *public corridor* from an adjacent *business and personal services occupancy* or a *mercantile occupancy* need not conform to Sentence (1), provided the *partitions* are not located in the only *means of egress*.

(5) *Exit* doors need not conform to Sentences (1) or (2) where,

(a) the doors serve accessory *buildings* where life safety is not adversely affected, or

(b) the doors serve *storage garages* or other accessory *buildings* serving a single *dwelling unit*.

9.9.6.5. Direction of Door Swing

(1) Except for doors serving a single *dwelling unit*, *exit* doors that are required to swing shall swing in the direction of *exit* travel.

(2) Doors that open onto a corridor or other facility that provides *access to exit* from a room or *suite* having an *occupant load* of more than 60 persons shall swing on the vertical axis in the direction of *exit* travel.

(3) Doors that divide a corridor that is not wholly contained within a *suite* shall swing in the direction of *exit* travel.

(4) Where a pair of doors is installed in a corridor that provides *access to exit* in both directions, the doors shall,

(a) swing in opposite directions, with the door on the right hand side swinging in the direction of *exit* travel, or

(b) swing in both directions.

9.9.6.6. Proximity of Doors to Stairs

(1) Except as provided in Sentence (2), the distance between a stair riser and the leading edge of a door in its swing, except for doors serving a single *dwelling unit*, shall be not less than 300 mm.

(2) Where there is a danger of blockage from ice or snow, an *exit* door, including a door serving a single *dwelling unit*, may open onto not more than one step provided the riser of such step does not exceed 150 mm.

9.9.6.7. Door Latching, Locking and Opening Mechanisms

(1) Principal entrance doors, *exit* doors and doors to *suites*, including exterior doors to *dwelling units*, and other doors in an *access to exit* shall,

(a) be openable from the inside or in travelling to an *exit* without requiring keys, special devices or specialized knowledge of the door opening mechanism, or

(b) in the case of *exit* doors, be controlled by electromagnetic locking mechanisms in accordance with Sentence 3.4.6.15.(4).

(2) Except for doors serving a single *dwelling unit* and doors to accessory *buildings* and garages serving a single *dwelling unit*, door release hardware on doors in a *means of egress* shall be operable with one hand and the door shall be openable with not more than one releasing operation.

(3) Door release hardware on doors in a *means of egress* shall be installed not more than 1 200 mm above the finished floor.

(4) Except for *hotels*, a door opening onto a *public corridor* that provides *access to exit* from *suites* shall be designed not to lock automatically when such doors are equipped with an automatic self-closing device.

9.9.6.8. Effort Required to Open

(1) Every *exit* door, except doors serving a single *dwelling unit*, shall be designed and installed so that when the latch is released the door will open in the direction of *exit* travel under a force of not more than 90 N applied to the door release hardware.

9.9.7. Access to Exits

9.9.7.1. Egress from Roof Area, Podiums, Terraces, Platforms and Contained Open Spaces

(1) An *access to exit* shall be provided from every roof intended for *occupancy* and from every podium, terrace, platform or contained open space.

(2) Where a roof is intended for an *occupant load* of more than 60 persons, at least 2 separate *means of egress* shall be provided from the roof to stairs designed in conformance with the requirements for *exit* stairs and located remote from each other.

(3) Where a podium, terrace, platform or contained open space is provided, egress requirements shall conform to the appropriate requirements for rooms or *suites* in Article 9.9.7.4.

9.9.7.2. Means of Egress from Suites

(1) Except as required in Sentence 9.9.9.3.(1), each *suite* in a *floor area* occupied by more than one *suite* shall have,

(a) an exterior *exit* doorway,

(b) a doorway to a *public corridor*, or

(c) a doorway to exterior passageway.

(2) Except as provided in Sentences 9.9.7.3.(1) and 9.9.8.2.(2), from the point where a doorway described in Clauses (1)(b) or (c) enters the *public corridor* or exterior passageway, it shall be possible to go in opposite directions to each of 2 separate *exits*.

9.9.7.3. Dead End Corridors

(1) A dead-end *public corridor* is permitted in an *occupancy* shown in Table 9.9.7.3. where,

(a) a dead-end corridor,

(i) does not exceed the distance of travel measured from the most remote point of the dead-end to a point where it is possible to go in opposite directions to each of two separate *exits*, and

(ii) is provided with doors equipped with self-closing devices, or

(b) there is a second and separate egress doorway from each room or *suite* not leading into the dead-end corridor.

Table 9.9.7.3.
Dead End Public Corridors

Forming Part of Sentence 9.9.7.3.(1)

COLUMN 1	COLUMN 2	COLUMN 3
Occupancy	Maximum Length of Dead-End *Public Corridor*, m	Maximum *Occupant Load* or *Suites* Served by Dead-End *Public Corridor*
Group C	6	4 *suites*
Group D	6	30
Group E	9	30
Group F	9	30

(2) Dead-end *public corridors* in *residential occupancies* and *business and personal services occupancies* shall contain only *suite* door openings arranged so that not more than 2 such doors have to be passed to reach the nearest *exit*.

(3) The area of wired glass in doors required by Sentence (2) shall not exceed 645 cm^2.

9.9.7.4. Number and Spacing of Egress Doors

(1) Except for *dwelling units*, at least 2 egress doors shall be provided where,

(a) the area of a room or *suite* exceeds 200 m^2 in a Group D, E, F2 and F3 *occupancy*, or 150 m^2 in a Group C *occupancy*, or

(b) the distance measured from any point within a room or *suite* to the nearest egress door exceeds 25 m.

(2) Doors in Sentence (1) shall be spaced so that in the event one door is made inaccessible by a fire within such a room or *suite*, the other door will provide safe egress.

9.9.7.5. Independent Access to Exit

(1) Required *access to exit* from *suites* shall not be through any other *dwelling unit*, *service room* or other *occupancy*.

9.9.7.6. Travel Distance within Rooms and Suites

(1) Except for *dwelling units*, the travel distance from any point within the room or *suite* to the nearest egress door shall not exceed the maximum travel distance in Article 9.9.8.2.

9.9.8. Exits From Floor Areas

9.9.8.1. Measurement of Travel Distance

(1) Except as provided in Sentences (2) and (3), for the purposes of this Subsection, travel distance means the distance from any point in the *floor area* to an *exit* measured along the path of *exit* travel.

(2) Where a room or *suite* is separated from the remainder of the *floor area* by a *fire separation* having a *fire-resistance rating* of at least 45 min, or in a *sprinklered building*, by a *fire separation* that is not required to have a *fire-resistance rating*, the travel distance is permitted to be measured from an egress door of the room or *suite* to the nearest *exit*.

(3) Where a *public corridor* is not less than 9 m wide and conforms to Clause 3.4.2.5.(1)(d), the travel distance is permitted to be determined in accordance with that Clause.

9.9.8.2. Number of Required Exits

(1) Except as provided in Sentences (2) and (3) and Subsection 9.9.9., no fewer than 2 *exits* shall be provided from every *floor area*, spaced so that the travel distance to the nearest *exit* is not more than,

(a) 40 m in the case of *business and personal services occupancies*,

(b) 45 m for all *occupancies* where the *floor area* is *sprinklered*, and

(c) 30 m for all other *occupancies*.

(2) Except as provided in Subsection 9.9.9., a single *exit* is permitted from each *storey* in *buildings* of 1 and 2 *storeys* in *building height* provided the *floor area* and travel distance requirements conform to those required in Article 9.9.7.4. and the total *occupant load* served by an *exit* facility does not exceed 60 persons.

(3) In *boarding, lodging or rooming houses*,

(a) where sleeping accommodation is provided for not more than 8 persons, a single *exit* is permitted from each *floor area*, or

(b) where sleeping accommodation is not provided in the *basement*, a single *exit* is permitted from the *basement floor area*.

9.9.8.3. Contribution of Each Exit

(1) Where more than 1 *exit* is required from a *floor area*, each *exit* shall be considered as contributing not more than half the required *exit* width.

9.9.8.4. Location of Exits

(1) Where more than 1 *exit* is required from a *floor area*, no fewer than 2 *exits* shall be independent of each other and be placed remote from each other along the path of travel between them.

9.9.8.5. Exiting through a Lobby

(1) Not more than one *exit* from a *floor area* is permitted to lead through a lobby.

(2) The floor of the lobby referred to in Sentence (1) shall be not more than 4.5 m above *grade*, and the path of travel through the lobby to the outdoors shall not exceed 15 m.

(3) The lobby referred to in Sentence (1) shall conform in all respects with the requirements for *exits*, except that rooms other than *service rooms*, storage rooms and rooms of *residential* or *industrial occupancy* are permitted to open directly onto such lobby.

(4) Except as required in Sentence (6), an *exit* is permitted to lead through a lobby referred to in Sentence (1) provided the lobby is not located within an *interconnected floor space* other than as described in Sentence 3.2.8.2.(6).

(5) Passenger elevator entrances are permitted to open onto the lobby referred to in Sentence (1) provided the elevator doors are designed to remain closed except while loading and unloading.

(6) An *exit* that serves a *hotel* is permitted to lead through a lobby referred to in Sentence (1) provided the lobby is not located within an *interconnected floor space*.

(7) Where the lobby referred to in Sentence (1) and adjacent *occupancies* that are permitted to open into the lobby are *sprinklered*, the *fire separation* between such *occupancies* and the lobby need not have a *fire-resistance rating*.

9.9.8.6. Mezzanine Means of Egress

(1) Except as permitted by Sentences (2) and (3), the space above a *mezzanine* shall be served by no fewer than 2 *means of egress* leading to *exits* accessible at the *mezzanine* level on the same basis as *floor areas*.

(2) One *means of egress* from a *mezzanine* is permitted where,

(a) the *mezzanine* is not required to terminate at a vertical *fire separation*, as permitted by Sentence 9.10.12.1.(2),

(b) the *occupant load* of the *mezzanine* is not more than 60,

(c) the area of the *mezzanine* does not exceed the area limits of Clause 9.9.7.4.(1)(a), and

(d) the distance limits of Clause 9.9.7.4.(1)(b) measured along the path of travel, are not exceeded from any point on the *mezzanine* to,

  (i) an egress door serving the space that the *mezzanine* overlooks if the space is served by a single egress door, or

  (ii) an egress stairway leading to an *access to exit* in the space below if that space is required to be served by two or more egress doorways in conformance with Sentence 9.9.7.4.(1).

(3) One of the *means of egress* from a *mezzanine* that is not required to terminate at a *fire separation* as permitted by Sentence 9.10.12.1.(2) and that exceeds the limits of Sentence (2), is permitted to lead through the room in which the *mezzanine* is located provided all other *means of egress* from that *mezzanine* lead to *exits* accessible at the *mezzanine* level.

(4) Except as provided in Sentence (2), the maximum travel distance from any point on a *mezzanine* to the nearest *exit* shall be not more than,

(a) 40 m in a *business and personal services occupancy*,

(b) 45 m in a *floor area* that is *sprinklered* provided it does not contain a *high hazard industrial occupancy*, or

(c) 30 m in any *floor area* not referred to in Clauses (a) or (b).

9.9.9. Egress from Dwelling Units

9.9.9.1. Travel Limit to Exits or Egress Doors

(1) Except as provided in Sentences (2) and (3), every *dwelling unit* containing more than 1 *storey* shall have *exits* or egress doors located so that it shall not be necessary to travel up or down more than 1 *storey* to reach a level served by,

(a) an egress door to a *public corridor*, enclosed *exit* stair or exterior passageway, or

(b) an *exit* doorway not more than 1 500 mm above adjacent ground level.

(2) Where a *dwelling unit* is not located above or below another *suite*, the travel limit from a floor level in the *dwelling unit* to an *exit* or egress door is permitted to exceed 1 *storey* where that floor level is served by an openable window or door,

(a) providing an unobstructed opening of not less than 1 000 mm in height and 550 mm in width, and

(b) located so that the sill is not more than,

  (i) 1 000 mm above the floor, and

  (ii) 7 m above adjacent ground level.

(3) The travel limit from a floor level in a *dwelling unit* to an *exit* or egress door is permitted to exceed 1 *storey* where that floor level has direct access to a balcony.

9.9.9.2. Two Separate Exits

(1) Except as provided in Sentence 9.9.7.2.(1), where an egress door from a *dwelling unit* opens onto a *public corridor* or exterior passageway it shall be possible from the location where the egress door opens onto the corridor or exterior passageway to go in opposite directions to 2 separate *exits* unless the *dwelling unit* has a second and separate *means of egress*.

9.9.9.3. Shared Egress Facilities

(1) A *dwelling unit* shall be provided with a second and separate *means of egress* where an egress door from the *dwelling unit* opens onto,

(a) an *exit* stairway serving more than 1 *suite*,

(b) a *public corridor* serving more than one *suite* served by a single *exit* stairway,

(c) an exterior passageway more than 1 500 mm above adjacent ground level, serving more than one *suite* and served by a single *exit* stairway, or

(d) a balcony more than 1 500 mm above adjacent ground level, serving more than one *suite* and served by a single *exit* stairway.

9.9.10. Signage

9.9.10.1. Application

(1) This Subsection applies to all *exits* except those serving not more than 1 *dwelling unit*.

9.9.10.2. Visibility of Exits

(1) *Exits* shall be located so as to be clearly visible or their locations shall be clearly indicated.

9.9.10.3. Required Exit Signs

(1) Except as required in Sentence (2), every *exit* door shall have an *exit* sign over or adjacent to it when the *exit* serves,

(a) a 3 *storey building*,

(b) a *building* with an *occupant load* greater than 150, or

(c) a room or *floor area* that has a fire escape as part of a required *means of egress*.

(2) Except for *suite* doors opening directly to the exterior, every *exit* serving a *hotel* shall have an *exit* sign placed over or adjacent to it.

9.9.10.4. Exit Direction Signs

(1) *Exit* direction signs shall be placed in corridors and passageways where necessary to indicate the direction of *exit* travel.

9.9.10.5. Visibility of Exit Signs

(1) *Exit* signs shall be installed so as to be visible from the *exit* approach.

9.9.10.6. Lettering

(1) *Exit* signs shall have the word **EXIT** or the words **EXIT/SORTIE** in red letters on a contrasting background or a red background with contrasting letters when the sign is internally lighted, and white letters on a red background or red letters on a white background when the sign is externally lighted.

(2) Lettering referred to in Sentence (1) shall be made with not less than 19 mm wide strokes and be not less than 150 mm high when the sign is externally lighted, and at least 114 mm high when the sign is internally lighted.

(3) Where an *exit* sign having the word **EXIT** is installed in conformance with Sentence (1), an additional sign having the word **SORTIE** is permitted to be installed.

9.9.10.7. Illumination

(1) Illumination of *exit* signs required in Article 9.9.10.3. shall conform to Sentences 9.9.11.3.(2) and (3).

(2) Where illumination of *exit* signs required in Article 9.9.10.3. is provided by an electrical circuit, that circuit shall serve no equipment other than emergency equipment.

9.9.10.8. Signs for Stairs and Ramps at Exit Level

(1) In *buildings* 3 *storeys* in *building height*, any part of an *exit* ramp or stairway that continues up or down past the lowest *exit level* shall be clearly marked to indicate that it does not lead to an *exit* where the portion below *exit level* may be mistaken as the direction of *exit* travel.

9.9.10.9. Floor Numbering

(1) Arabic numerals indicating the assigned floor number shall be,

(a) except in *hotels*, mounted permanently on the stair side of the wall at the latch side of doors to *exit* stair shafts,

(b) in *hotels*, mounted permanently on each side of the *exit* doors to the *exit* stair shaft,

(c) not less than 60 mm high, raised approximately 0.7 mm above the surface,

(d) located 1 500 mm from the finished floor and not more than 300 mm from the door, and

(e) contrasting in colour with the surface on which they are applied.

9.9.11. Lighting

9.9.11.1. Application

(1) This Subsection applies to the lighting of all *exits* except those serving not more than 1 *dwelling unit*.

9.9.11.2. Required Lighting in Egress Facilities

(1) Every *exit*, *public corridor* or corridor providing *access to exit* for the public shall be equipped to provide illumination to an average level of not less than 50 lx at floor or tread level and at all points such as angles and intersections at changes of level where there are stairs or ramps.

9.9.11.3. Emergency Lighting

(1) Emergency lighting shall be provided in,

(a) *exits,*

(b) principal routes providing *access to exit* in an open *floor area,*

(c) corridors used by the public,

(d) underground *walkways*, and

(e) *public corridors.*

(2) Emergency lighting required in Sentence (1) shall be provided from a source of energy separate from the electrical supply for the *building*.

(3) Lighting required in Sentence (1) shall be designed to be automatically actuated for a period of not less than 30 min when the electric lighting in the affected area is interrupted.

(4) Illumination from lighting required in Sentence (1) shall be provided to average levels of not less than 10 lx at floor or tread level.

(5) Where incandescent lighting is provided, lighting equal to 1 W/m² of *floor area* shall be considered to meet the requirement in Sentence (4).

(6) Where self-contained emergency lighting units are used, they shall conform to CSA C22.2 No. 141-M, "Unit Equipment for Emergency Lighting".

Section 9.10. Fire Protection

9.10.1. Definitions and Application

9.10.1.1. Support of Noncombustible Construction

(1) Where an assembly is required to be of *noncombustible construction* and to have a *fire-resistance rating*, it shall be supported by *noncombustible construction*.

9.10.1.2. Sloped Roofs

(1) For the purposes of this Section, roofs with slopes of 60° or more to the horizontal and that are adjacent to a room or space intended for *occupancy* shall be considered as a wall.

9.10.1.3. Items Under Part 3 Jurisdiction

(1) Tents, *air-supported structures*, transformer vaults, *walkways*, elevators and escalators shall conform to Part 3.

(2) Where rooms or spaces are intended for an *assembly occupancy*, such rooms or spaces shall conform to Part 3.

(3) *Basements* containing more than 1 *storey* or exceeding 600 m^2 in area shall conform to Part 3.

(4) Where rooms or spaces are intended for the storage, manufacture or use of hazardous or explosive material, such rooms or spaces shall conform to Part 3.

(5) Reserved

(6) Openings through floors that are not protected by shafts or *closures* shall be protected in conformance with Subsection 3.2.8.

(7) Chutes and shafts shall conform to Subsection 3.6.3. except where they are contained entirely within a *dwelling unit*.

(8) Where sprinkler, standpipe and hose systems are installed, they shall be installed in conformance with Part 3.

9.10.1.4. Items Under Part 6 Jurisdiction

(1) In kitchens containing commercial cooking equipment used in processes producing grease-laden vapours, the equipment shall be designed and installed in conformance with Part 6

(2) Where fuel-fired *appliances* are installed on a roof, such *appliances* shall be installed in conformance with Part 6.

9.10.2. Occupancy Classification

9.10.2.1. Occupancy Classification

(1) Except as provided in Article 9.10.2.2., every *building* or part of it shall be classified according to its *major occupancy* as belonging to one of the groups or divisions described in Table 9.10.2.1.

Table 9.10.2.1.
Occupancy Classifications

Forming Part of Sentence 9.10.2.1.(1)

COLUMN 1	COLUMN 2	COLUMN 3
Group	Division	Description of *Major Occupancies*
C	—	Residential occupancy
D	—	*Business and personal services occupancies*
E	—	*Mercantile occupancies*
F	2	*Medium hazard industrial occupancies*
F	3	*Low hazard industrial occupancies* (Does not include *storage garages* serving individual *dwelling units*)

9.10.2.2. Custodial and Convalescent Homes

(1) Children's custodial homes and convalescent homes for ambulatory occupants living as a single housekeeping unit in a *suite* with sleeping accommodation for not more than 10 persons are permitted to be classified as *residential occupancies* (Group C).

9.10.2.3. Major Occupancies above Other Major Occupancies

(1) Except as permitted in Article 9.10.2.4., in any *building* containing more than 1 *major occupancy* in which one *major occupancy* is located entirely above another, the requirements of Article 9.10.8.1. for each portion of the *building* containing a *major occupancy* shall be applied to that portion as if the entire *building* was of that *major occupancy*.

9.10.2.4. Buildings Containing More Than One Major Occupancy

(1) In a *building* containing more than 1 *major occupancy*, where the aggregate area of all *major occupancies* in a particular group or division does not exceed 10% of the *floor area* on the *storey* on which they are located, they need not be considered as *major occupancies* for the purposes of Articles 9.10.8.1. and 9.10.2.3. provided they are not classified as Group F, Division 2 *occupancies*.

9.10.2.5. Restaurants

(1) A restaurant is permitted to be classified as a Group E *major occupancy* provided such restaurant is designed to accommodate not more than 30 persons consuming food or drink.

9.10.3. Ratings

9.10.3.1. Fire-Resistance and Fire-Protection Ratings

(1) Where a *fire-resistance rating* or a *fire-protection rating* is required in this Section for an element of a *building*, such rating shall be determined in conformance with the test methods described in Part 3, or in accordance with Supplementary Standard SB-2.

9.10.3.2. Flame-Spread Rating

(1) Where a *flame-spread rating* is required in this Section for an element of a *building*, such rating shall be determined in accordance with the test methods described in Part 3, or in accordance with Supplementary Standard SB-2.

(2) Unless the *flame-spread rating* is referred to in this Part as a "surface *flame-spread rating*", it shall apply to any surface of the element being considered that would be exposed by cutting through it as well as to the exposed surface of the element.

9.10.3.3. Fire Exposure

(1) Floor, roof and ceiling assemblies shall be rated for exposure to fire on the underside.

(2) Exterior walls shall be rated for exposure to fire from inside the *building*, except that such walls need not comply with the temperature rise limitations required by the standard tests referred to in Article 9.10.3.1. if such walls have a *limiting distance* of not less than 1 200 mm, and due allowance is made for the effects of heat radiation in accordance with the requirements in Part 3.

(3) *Firewalls* and interior vertical *fire separations* required to have *fire-resistance ratings* shall be rated for exposure to fire on each side.

9.10.3.4. Suspended Membrane Ceiling

(1) Where a ceiling construction has a suspended membrane ceiling with lay-in panels or tiles that contribute to the required *fire-resistance rating*, hold down clips or other means shall be provided to prevent the lifting of such panels or tiles in the event of a fire.

9.10.4. Building Size Determination

9.10.4.1. Mezzanines not Considered as Storeys

(1) *Mezzanines* shall not be considered as *storeys* for the purpose of determining *building height* where the aggregate area of *mezzanine* floors does not exceed 10% of,

(a) the *suite* in which it is located, where there is more than one *suite* in the *storey*, or

(b) the *storey* in which it is located, in all other cases.

(2) *Mezzanines* shall not be considered as *storeys* for the purpose of determining *building height* where they occupy an aggregate area not exceeding 40% of the area of the room or the *storey* in which they are located provided the space above the *mezzanine* floor has no visual obstructions more than 1 070 mm above such floors.

9.10.4.2. More Than One Level of Mezzanine

(1) Where more than 1 level of *mezzanine* is provided in a *storey*, each level additional to the first shall be considered as a *storey*.

9.10.4.3. Basement Storage Garage

(1) Where a *basement* is used primarily as a *storage garage*, the *basement* is permitted to be considered as a separate *building* for the purposes of this Section provided the floor above the *basement* and the exterior walls of the *basement* above the adjoining ground level are constructed as *fire separations* of masonry or concrete having a *fire-resistance rating* of not less than 2 h.

9.10.4.4. Roof-Top Enclosures

(1) Roof-top enclosures provided for elevator machinery, stairways and *service rooms*, used for no purpose other than for service to the *building*, shall not be considered as a *storey* in calculating the *building height*.

9.10.5. Permitted Openings in Wall and Ceiling Assemblies

9.10.5.1. Permitted Openings in Wall and Ceiling Membranes

(1) Except as permitted in Sentences (2) and (4), a membrane forming part of an assembly required to have a *fire-resistance rating* shall not be pierced by openings into the assembly unless the assembly has been tested and rated for such openings.

(2) A wall or ceiling membrane forming part of an assembly required to have a *fire-resistance rating* is permitted to be pierced by openings for electrical and similar service outlet boxes provided such outlet boxes are tightly fitted.

(3) Where boxes referred to in Sentence (2) are located on both sides of walls required to provide a *fire-resistance rating*, they shall be offset where necessary to maintain the integrity of the *fire separation*.

(4) A membrane ceiling forming part of an assembly assigned a *fire-resistance rating* on the basis of Table 1.2. in Supplementary Standard SB-3, is permitted to be pierced by openings leading to ducts within the ceiling space provided the ducts, the amount of openings and their protection conform to the requirements in Supplementary Standard SB-2.

9.10.6. Construction Types

9.10.6.1. Combustible Elements in Noncombustible Construction

(1) Where a *building* or part of a *building* is required to be of *noncombustible construction*, *combustible* elements shall be limited in conformance with the requirements in Subsection 3.1.5.

9.10.6.2. Heavy Timber Construction

(1) *Heavy timber construction* shall be considered to have a 45 min *fire-resistance rating* when it is constructed in accordance with the requirements for *heavy timber construction* in Article 3.1.4.6.

9.10.7. Steel Members

9.10.7.1. Protection of Structural Steel Members

(1) Except as permitted in Article 3.2.2.3., structural steel members used in construction required to have a *fire-resistance rating* shall be protected to provide the required *fire-resistance rating*.

9.10.8. Fire-Resistance and Combustibility in Relation to Occupancy, Height and Supported Elements

9.10.8.1. Fire-Resistance Ratings for Floors and Roofs

(1) Except as otherwise provided in this Subsection, the *fire-resistance ratings* of floors and roofs shall conform to Table 9.10.8.1.

Table 9.10.8.1.
Fire Resistance Ratings for Structural Members and Assemblies

Forming Part of Sentence 9.10.8.1.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5
Major Occupancy	Maximum *Building Height*, *Storeys*	Minimum *Fire-Resistance Rating* by *Building* Element, min		
		Floors Except Floors over Crawl Spaces	*Mezzanine* Floors	Roofs
Residential (Group C)	3	45	45	—
All other *occupancies*	2	45	—	—
	3	45	45	45

9.10.8.2. Fire-Resistance Ratings in Sprinklered Buildings

(1) Except for roofs that support an *occupancy*, the requirements in Table 9.10.8.1. for roof assemblies to have a *fire-resistance rating* are permitted to be waived in *sprinklered buildings* where,

(a) the sprinkler system is electrically supervised in conformance with Sentence 3.2.4.9.(2), and

(b) the operation of the sprinkler system will cause a signal to be transmitted to the fire department in conformance with Sentence 3.2.4.7.(4).

9.10.8.3. Fire-Resistance Ratings for Walls, Columns and Arches

(1) Except as otherwise provided in this Subsection, all *loadbearing* walls, columns and arches in the *storey* immediately below a floor or roof assembly shall have a *fire-resistance rating* of not less than that required for the supported floor or roof assembly.

9.10.8.4. Reserved

9.10.8.5. Service Rooms

(1) Construction supporting a *service room* need not conform to Article 9.10.8.3.

9.10.8.6. Mezzanines

(1) Mezzanines required to be counted as *storeys* in Articles 9.10.4.1. and 9.10.4.2. shall be constructed in conformance with the requirements for "Floors Except Floors over Crawl Spaces" in Table 9.10.8.1.

9.10.8.7. Roofs Supporting an Occupancy

(1) Where a portion of a roof supports an *occupancy*, that portion shall be constructed as a *fire separation* having a *fire-resistance rating* conforming to the rating for "Floors Except Floors over Crawl Spaces" in Table 9.10.8.1.

9.10.8.8. Floors of Exterior Passageways

(1) Except as provided in Sentences (2) and (3), the floor assembly of every exterior passageway used as part of a *means of egress* shall have a *fire-resistance rating* of not less than 45 min or be of *noncombustible construction*.

(2) No *fire-resistance rating* is required for floors of exterior passageways serving *buildings* of Group D, E or F *major occupancy* that are not more than 2 *storeys* in *building height*.

(3) No *fire-resistance rating* is required for floors of exterior passageways serving a single *dwelling unit* where no *suite* is located above or below the *dwelling unit*.

9.10.8.9. Crawl Spaces

(1) Where a crawl space exceeds 1 800 mm in height or is used for any *occupancy* or as a *plenum* in *combustible construction* or for the passage of *flue pipes*, it shall be considered as a *basement* in applying the requirements in Article 9.10.8.1.

9.10.8.10. Application to Houses

(1) Table 9.10.8.1. does not apply to a *dwelling unit* that has no other *dwelling unit* above or below it or to a *dwelling unit* that is not above or below another *major occupancy*.

9.10.8.11. Part 3 as an Alternative

(1) The *fire-resistance ratings* of floors, roofs, *loadbearing* walls, columns and arches need not conform to this Subsection if such assemblies conform in all respects to the appropriate requirements in Section 3.2.

9.10.9. Fire Separations Between Rooms and Spaces Within Buildings

9.10.9.1. Application

(1) This Subsection applies to *fire separations* required between rooms and spaces in *buildings* except between rooms and spaces within a *dwelling unit*.

9.10.9.2. Continuous Barrier

(1) Except as permitted in Article 9.10.9.3., a wall or floor assembly required to be a *fire separation* shall be constructed as a continuous barrier against the spread of fire.

(2) The continuity of a *fire separation* shall be maintained where it abuts another *fire separation*, a floor, a ceiling, a roof or an exterior wall assembly.

9.10.9.3. Openings to be Protected With Closures

(1) Except as permitted in Articles 9.10.9.5. to 9.10.9.7., openings in required *fire separations* shall be protected with *closures* conforming to Subsection 9.10.13.

9.10.9.4. Floor Assemblies

(1) Except as permitted in Sentences (2) to (4), all floor assemblies shall be constructed as *fire separations*.

(2) Floor assemblies contained within *dwelling units* need not be constructed as *fire separations*.

(3) Floor assemblies for which no *fire-resistance rating* is required by Subsection 9.10.8. and floors of *mezzanines* not required to be counted as *storeys* in Articles 9.10.4.1. and 9.10.4.2. need not be constructed as *fire separations*.

(4) Where a crawl space is not required by Article 9.10.8.8. to be constructed as a *basement*, the floor above it need not be constructed as a *fire separation*.

9.10.9.5. Interconnected Floor Spaces

(1) Except as permitted in Article 9.9.4.7., *interconnected floor spaces* shall conform to the requirements of Subsection 3.2.8.

9.10.9.6. Service Equipment Penetrating a Fire Separation

(1) Piping, tubing, ducts, *chimneys*, wiring, conduit, electrical outlet boxes and other similar service equipment that penetrate a required *fire separation* shall be tightly fitted or fire stopped to maintain the integrity of the separation.

(2) Except as provided in Sentences (3) to (9) and Article 9.10.9.7., pipes, ducts, electrical outlet boxes, totally enclosed raceways or other similar service equipment that partly or wholly penetrate an assembly required to have a *fire-resistance rating* shall be *noncombustible* unless the assembly has been tested incorporating such equipment.

(3) Electrical wires or other similar wiring enclosed in *noncombustible* totally enclosed raceways are permitted to partly or wholly penetrate an assembly required to have a *fire-resistance rating* without being incorporated in the assembly at the time of testing as required in Sentence (2).

(4) Electrical wires or cables, single or grouped, with *combustible* insulation or jacketing that is not totally enclosed in raceways of *noncombustible* material, are permitted to partly or wholly penetrate an assembly required to have a *fire-resistance rating* without being incorporated in the assembly at the time of testing as required in Sentence (2) provided the overall diameter of the wiring is not more than 25 mm.

(5) *Combustible* totally enclosed raceways that are embedded in a concrete floor slab are permitted in an assembly required to have a *fire-resistance rating* without being incorporated in the assembly at the time of testing as required in Sentence (2), where the concrete provides at least 50 mm of cover between the raceway and the bottom of slab.

(6) *Combustible* outlet boxes are permitted in an assembly required to have a *fire-resistance rating* without being incorporated in the assembly at the time of testing as required in Sentence (2) provided the opening through the membrane into the box does not exceed 160 cm^2.

(7) *Combustible* water distribution piping that has an outside diameter not more than 30 mm is permitted to partly or wholly penetrate a vertical *fire separation* that is required to have a *fire-resistance rating* without being incorporated in the assembly at the time of testing as required in Sentence (2) provided the piping is sealed in conformance with Article 3.1.9.1.

(8) *Combustible* sprinkler piping is permitted to penetrate a *fire separation* provided the *fire compartments* on each side of the *fire separation* are *sprinklered*.

(9) Combustible piping for central vacuum systems is permitted to penetrate a *fire separation* provided the installation conforms to the requirements that apply to *combustible* piping in Sentences 9.10.9.7.(2) to (6).

9.10.9.7. Combustible Piping

(1) Except as permitted in Sentences (2) to (6), *combustible* piping shall not be used where any part of a piping system partly or wholly penetrates a *fire separation* required to have a *fire-resistance rating* or penetrates a membrane that contributes to the required *fire-resistance rating* of an assembly.

(2) *Combustible* piping not located in a vertical shaft is permitted to penetrate a *fire separation* required to have a *fire-resistance rating* or a membrane that forms part of an assembly required to have a *fire-resistance rating* provided the piping is sealed at the penetration by a firestop system that has an F rating not less than the *fire-resistance rating* required for the *fire separation*.

(3) The rating referred to in Sentence (2) shall be based on ULC-S115, "Fire Tests for Firestop Systems", with a pressure differential of 50 Pa between the exposed and unexposed sides, with the higher pressure on the exposed side.

(4) *Combustible* drain piping is permitted to penetrate a horizontal *fire separation* or a membrane that contributes to the required *fire-resistance rating* of a horizontal *fire separation* provided it leads directly from a *noncombustible* water closet through a concrete floor slab.

(5) *Combustible* piping is permitted,

(a) on one side of a vertical *fire separation* provided it is not located in a vertical shaft, and

(b) to penetrate a vertical or horizontal *fire separation* when the *fire compartment* on each side of the *fire separation* is *sprinklered*.

(6) In *buildings* containing 2 *dwelling units* only, *combustible* piping is permitted on one side of a horizontal *fire separation*.

9.10.9.8. Collapse of Combustible Construction

(1) *Combustible construction* that abuts on or is supported by a *noncombustible fire separation* shall be constructed so that its collapse under fire conditions will not cause collapse of the *fire separation*.

9.10.9.9. Reduction in Thickness of Fire Separation by Beams and Joists

(1) Where pockets for the support of beams or joists are formed in a masonry or concrete *fire separation*, the remaining total thickness of solid masonry and/or grout and/or concrete shall be not less than the required equivalent thickness shown for type S monolithic concrete in Table 2.1.1. of the Supplementary Standard SB-2 for the required *fire-resistance rating*.

9.10.9.10. Concealed Spaces above Fire Separations

(1) Except as provided in Sentence (2), a *horizontal service space* or other concealed space located above a required vertical *fire separation* shall be divided at the *fire separation* by an equivalent *fire separation* within the space.

(2) Where a *horizontal service space* or other concealed space is located above a required vertical *fire separation* other than a vertical shaft, such space need not be divided as required in Sentence (1) provided the construction between such space and the space below is constructed as a *fire separation* having a *fire-resistance rating* not less than that required for the vertical *fire separation*, except that where the vertical *fire separation* is not required to have a *fire-resistance rating* greater than 45 min, the *fire-resistance rating* of the ceiling is permitted to be reduced to 30 min.

9.10.9.11. Separation of Residential Occupancies

(1) Except as provided in Sentences (2) and (4), *residential occupancies* shall be separated from all other *major occupancies* by a *fire separation* having a *fire-resistance rating* of not less than 1 h.

(2) Except as provided in Sentence (3), a *major occupancy* classified as a *residential occupancy*, including *live/work units*, shall be separated from other *major occupancies* classified as *mercantile* or *medium hazard industrial occupancies* by a *fire separation* having a *fire-resistance rating* of not less than 2 h.

(3) Where not more than 2 *dwelling units* or *live/work units* are located in a *building* containing a *mercantile occupancy*, such *mercantile occupancy* shall be separated from the *dwelling units* or *live/work units* by a *fire separation* having not less than 1 h *fire-resistance rating*.

(4) The requirement for *fire separations* between *major occupancies* in Sentence (1) is waived for the *occupancies* allowed within *live/work units*.

9.10.9.12. Residential Suites, Live/Work Units and Industrial Buildings

(1) Except as provided in Sentence (2), not more than 1 *suite* of *residential occupancy* shall be contained within a *building* classified as a Group F, Division 2 *major occupancy*.

(2) Except where a Group F Division 2 *major occupancy* is directly related to *live/work units*, not more than one *suite* of *residential occupancy* shall be contained within a *building* classified as Group F, Division 2 *major occupancy*.

9.10.9.13. Separation of Suites

(1) Except as required in Article 9.10.9.14., and as permitted by Sentence (2), each *suite* in other than *business and personal services occupancies* shall be separated from adjoining *suites* by a *fire separation* having a *fire-resistance rating* of not less than 45 min.

(2) In *sprinklered buildings*, *suites* of *business and personal services occupancy* and *mercantile occupancy* that are served by *public corridors* conforming with Sentence 3.3.1.4.(4) are not required to be separated from each other by *fire separations*.

9.10.9.14. Separation of Residential Suites

(1) Except as provided in Sentences (2) and (3) and Article 9.10.21.2., *suites* in *residential occupancies* shall be separated from adjacent rooms and *suites* by a *fire separation* having a *fire-resistance rating* of not less than 45 min.

(2) Sleeping rooms in *boarding, lodging or rooming houses* where sleeping accommodation is provided for not more than 8 boarders or lodgers shall be separated from the remainder of the *floor area* by a *fire separation* having a *fire-resistance rating* of not less than 30 min where the sleeping rooms form part of the proprietor's residence and do not contain cooking facilities.

(3) *Dwelling units* that contain 2 or more *storeys* including *basements* shall be separated from the remainder of the *building* by a *fire separation* having a *fire-resistance rating* of not less than 1 h.

9.10.9.15. Separation of Public Corridors

(1) Except as provided in Sentences (2) and (3), *public corridors* shall be separated from the remainder of the *building* by a *fire separation* having not less than a 45 min *fire-resistance rating*.

(2) In other than *residential occupancies*, no *fire-resistance rating* is required for *fire separations* between a *public corridor* and the remainder of the *building* if,

(a) the *floor area* is *sprinklered*,

(b) the sprinkler system is electrically supervised in conformance with Sentence 3.2.4.9.(2), and

(c) the operation of the sprinkler system will cause a signal to be transmitted to the fire department in conformance with Sentence 3.2.4.7.(4).

(3) In other than *residential occupancies*, no *fire separation* is required between a *public corridor* and the remainder of the *building* if,

(a) the *floor area* is *sprinklered*,

(b) the sprinkler system is electrically supervised in conformance with Sentence 3.2.4.9.(2),

(c) the operation of the sprinkler system will cause a signal to be transmitted to the fire department in conformance with Sentence 3.2.4.7.(4), and

(d) the corridor exceeds 5 m in width.

9.10.9.16. Separation of Storage Garages

(1) Except as provided in Sentences (2) and (3), a *storage garage* shall be separated from other *occupancies* by a *fire separation* having not less than a 1.5 h *fire-resistance rating*.

(2) Except as permitted in Sentence (3), *storage garages* containing 5 motor vehicles or fewer shall be separated from other *occupancies* by a *fire separation* of not less than 1 h.

(3) Where a *storage garage* serves only the *dwelling unit* to which it is attached or in which it is built, it shall be considered as part of that *dwelling unit* and the *fire separation* required in Sentence (2) need not be provided between the garage and the *dwelling unit*.

(4) Where a *storage garage* is attached to or built into a *building* of *residential occupancy*,

(a) an *air barrier system* conforming to Subsection 9.25.3, shall be installed between the garage and the remainder of the *building* to provide an effective barrier to gas and exhaust fumes, and

(b) every door between the garage and the remainder of the *building* shall conform to Article 9.10.13.15.

(5) Where membrane materials are used to provide the required airtightness in the *air barrier system*, all joints shall be sealed and structurally supported.

9.10.9.17. Separation of Repair Garages

(1) Except as provided in Sentences (2) and (3), a *repair garage* shall be separated from other *occupancies* by a *fire separation* having a *fire-resistance rating* of not less than 2 h.

(2) Ancillary spaces directly serving a *repair garage*, including waiting rooms, reception rooms, tool and parts storage areas and supervisory office space need not be separated from the *repair garage* but shall be separated from other *occupancies* as required in Sentence (1).

(3) The *fire separation* referred to in Sentence (1) shall have a *fire-resistance rating* of not less than 1 h, where,

(a) the *building* is not more than one *storey* in *building height*,

(b) the *building* is operated as a single *suite*, and

(c) the only *occupancy* other than the *repair garage* is a *mercantile occupancy*.

(4) Where a *building* containing a *repair garage* also contains a *dwelling unit*, an *air barrier system* conforming to Subsection 9.25.3. shall be installed between the *dwelling unit* and the *suite* containing the garage to provide an effective air barrier to gas and exhaust fumes.

(5) Where membrane materials are used to provide the required airtightness in the *air barrier system*, all joints shall be sealed and structurally supported.

9.10.9.18. Exhaust Ducts Serving More Than One Fire Compartment

(1) Where a *vertical service space* contains an *exhaust* duct that serves more than one *fire compartment*, the duct shall have a fan located at or near the exhaust outlet to ensure that the duct is under negative pressure.

(2) Individual *fire compartments* referred to in Sentence (1) shall not have fans that exhaust directly into the duct in the *vertical service space*.

9.10.9.19. Central Vacuum Systems

(1) A central vacuum system shall serve not more than one *suite*.

9.10.10. Service Rooms

9.10.10.1. Application

(1) This Subsection applies to *service rooms* in all *buildings* except rooms located within a *dwelling unit*.

9.10.10.2. Service Room Floors

(1) The *fire-resistance rating* requirements in this Subsection do not apply to the floor assembly immediately below a *service room*.

9.10.10.3. Separation of Service Rooms

(1) Except as required in Sentence (2) and Articles 9.10.10.5. and 9.10.10.6., *service rooms* shall be separated from the remainder of the *building* by a *fire separation* having a *fire-resistance rating* of not less than 1 h when the *floor area* containing the *service room* is not *sprinklered*.

(2) Where a room contains a limited quantity of service equipment and the service equipment does not constitute a fire hazard, the requirements in Sentence (1) shall not apply.

9.10.10.4. Appliances and Equipment to be Located in a Service Room

(1) Except as provided in Sentence (2) and Article 9.10.10.5., fuel-fired *appliances* other than fireplaces shall be located in a *service room* separated from the remainder of the *building* by a *fire separation* having not less than a 1 h *fire-resistance rating*.

(2) Except as required in the *appliance* installation standards referenced in Sentences 6.2.1.4.(1) and 9.33.1.2.(1), fuel-fired *space-heating appliances*, space-cooling *appliances* and *service water heaters* need not be separated from the remainder of the *building* as required in Sentence (1) where the equipment serves,

(a) not more than one room or *suite*, or

(b) a *building* with a *building* area of not more than 400 m^2 and a *building height* of not more than 2 *storeys*.

9.10.10.5. Incinerators

(1) *Service rooms* containing incinerators shall be separated from the remainder of the *building* by a *fire separation* having a *fire-resistance rating* of not less than 2 h.

(2) The design, construction, installation and alteration of each indoor incinerator shall conform to NFPA 82, "Incinerators, Waste and Linen Handling Systems and Equipment".

(3) Every incinerator shall be connected to a *chimney flue* conforming to the requirements in Section 9.21. and serving no other *appliance*.

(4) An incinerator shall not be located in a room with other fuel-fired *appliances*.

9.10.10.6. Storage Rooms

(1) Rooms for the temporary storage of *combustible* refuse in all *occupancies* or for public storage in *residential occupancies* shall be separated from the remainder of the *building* by a *fire separation* having not less than a 1 h *fire-resistance rating*, except that a 45 min *fire separation* is permitted where the *fire-resistance rating* of the floor assembly is not required to exceed 45 min, or where such rooms are *sprinklered*.

9.10.10.7. Emergency Power Installations

(1) A generator to supply emergency power for lighting and fire safety systems shall be located in a room that,

(a) is separated from the remainder of the *building* by a *fire separation* with a *fire-resistance rating* not less than,

  (i) 1 h, if the floor assembly is not required to have a *fire-resistance rating* of more than 1 h, and

  (ii) 2 h, if the floor assembly is required to have a *fire-resistance rating* of more than 1 h, and

(b) contains only the generating set and equipment that is related to the emergency power supply system.

9.10.11. Firewalls

9.10.11.1. Required Firewalls

(1) Except as provided in Articles 9.10.11.2. and 9.10.11.4., a *party wall* on a property line shall be constructed as a *firewall*.

9.10.11.2. Firewalls Not Required

(1) In a *building* of *residential occupancy* in which there is no *dwelling unit* above another *dwelling unit*, a *party wall* on a property line between *dwelling units* need not be constructed as a *firewall* provided it is constructed as a *fire separation* having not less than a 1 h *fire-resistance rating*.

(2) The wall described in Sentence (1) shall provide continuous protection from the top of the footings to the underside of the roof deck.

(3) Any space between the top of the wall described in Sentence (1) and the roof deck shall be tightly filled with mineral wool or *noncombustible* material.

9.10.11.3. Construction of Firewalls

(1) Where *firewalls* are used, the requirements in Part 3 shall apply.

9.10.11.4. Firewalls in Detached Garages

(1) Where a garage is detached from the *dwelling unit* but attached to another garage on the adjacent property, the *party wall* so formed shall be constructed as a *fire separation* having a *fire-resistance rating* of not less than 45 min.

9.10.12. Prevention of Fire Spread at Exterior Walls and Between Storeys

9.10.12.1. Termination of Floors or Mezzanines

(1) Except as provided in Sentence (2) and in Articles 9.10.1.3. and 9.10.9.5., the portions of a *floor area* or *mezzanine* that do not terminate at an exterior wall, a *firewall* or a vertical shaft, shall terminate at a vertical *fire separation* having a *fire-resistance rating* not less than that required for the floor assembly that terminates at the separation.

(2) A *mezzanine* need not terminate at a vertical *fire separation* where the *mezzanine* is not required to be considered as a *storey* in Articles 9.10.4.1. and 9.10.4.2.

9.10.12.2. Location of Skylights

(1) Where a wall in a *building* is exposed to a fire hazard from an adjoining roof of a separate unsprinklered *fire compartment* in the same *building*, the roof shall contain no skylights within a horizontal distance of 5 m of the windows in the exposed wall.

9.10.12.3. Exterior Walls Meeting at an Angle

(1) Except as provided in Article 9.9.4.5., where exterior walls of a *building* meet at an external angle of less than 135°, the horizontal distance from an opening in one wall to an opening in the other wall shall be not less than 1 200 mm where the openings are in different *fire compartments*.

(2) The exterior wall of each *fire compartment* referred to in Sentence (1) within the 1 200 mm distance, shall have a *fire-resistance rating* not less than that required for the interior vertical *fire separation* between the compartment and the remainder of the *building*.

9.10.12.4. Protection of Soffits

(1) This Article applies to the portion of any soffit enclosing a projection that is,

(a) less than 2.5 m vertically above a window or door, and

(b) less than 1.2 m from either side of the window or door.

(2) Except as provided in Sentences (4) and (5), the soffit described in Sentence (1) and shall be protected in accordance with Sentence (3) where the soffit encloses,

(a) a common *attic or roof space* that spans more than 2 *suites* of *residential occupancy* and projects beyond the exterior wall of the *building*,

(b) a floor space where an upper *storey* projects beyond the exterior wall of a lower *storey* and a *fire separation* is required at the floor between the two *storeys*, or

(c) a floor space where an upper *storey* projects beyond the exterior wall of a lower *storey*, and the projection is continuous across a vertical *fire separation* separating two *suites*.

(3) Protection required by Sentence (2) shall be provided by,

(a) *noncombustible* material having a minimum thickness of 0.38 mm and a melting point not below 650°C,

(b) not less than 12.7 mm thick gypsum soffit board or gypsum wallboard installed according to CSA A82.31-M, "Gypsum Board Application,"

(c) not less than 11 mm thick plywood,

(d) not less than 12.5 mm thick OSB or waferboard, or

(e) not less than 11 mm thick lumber.

(4) In the case of a soffit described in Sentence (1) that is at the edge of an *attic or roof space*, and completely separated from the remainder of the *attic or roof space* by fire stopping, the requirements in Sentence (2) do not apply.

(5) Where all *suites* spanned by a common *attic or roof space* or situated above or below the projecting floor are *sprinklered*, the requirements in Sentence (2) do not apply provided that all rooms, including closets and bathrooms, having openings in the wall beneath the soffit are *sprinklered*, notwithstanding any exceptions in the sprinkler standards referenced in Article 3.2.5.13.

9.10.13. Doors, Dampers and Other Closures in Fire Separations

9.10.13.1. Closures

(1) Except as provided in Article 9.10.13.2., openings in required *fire separations* shall be protected with a *closure* conforming to Table 9.10.13.1. and shall be installed in conformance with Chapters 2 to 14 of NFPA 80, "Fire Doors and Windows", unless otherwise specified in this Part.

Table 9.10.13.1.
Fire-Protection Ratings for Closures

Forming Part of Sentence 9.10.13.1.(1)

COLUMN 1	COLUMN 2
Required Fire-Resistance Rating of Fire Separation	Required Fire-Protection Rating of Closure
30 or 45 min	20 min(1)
1 h	45 min(1)
1.5 h	1 h
2 h	1.5 h
3 h	2 h
4 h	3 h

Notes to Table 9.10.13.1.:

(1) See Article 9.10.13.2.

9.10.13.2. Solid Core Wood Door as a Closure

(1) A 45 mm thick solid core wood door is permitted to be used where a minimum *fire-protection rating* of 20 min is permitted or between a *public corridor* and a *suite* provided the door conforms to CAN4-S113, "Wood Core Doors Meeting the Performance Required by CAN4-S104-77 for Twenty Minute Fire-Rated Closure Assemblies".

(2) Doors described in Sentence (1) shall have not more than a 6 mm clearance beneath and not more than 3 mm at the sides and top.

9.10.13.3. Unrated Wood Door Frames

(1) Doors required to provide a 20 min *fire-protection rating* or permitted to be 45 mm solid core wood shall be mounted in a wood frame of at least 38 mm thickness where the frame has not been tested and rated.

9.10.13.4. Doors as a Means of Egress

(1) Doors forming part of an *exit* or a public *means of egress* shall conform to Subsection 9.9.6. in addition to this Subsection.

9.10.13.5. Wired Glass as a Closure

(1) Wired glass conforming to Article 9.7.3.1. that has not been tested in accordance with Article 9.10.3.1. is permitted as a *closure* in a vertical *fire separation* required to have a *fire-resistance rating* of not more than 1 h provided such glass is not less than 6 mm thick and is mounted in conformance with Sentence (2).

(2) Wired glass described in Sentence (1) shall be mounted in fixed steel frames having a minimum metal thickness of not less than 1.35 mm and a glazing stop of not less than 20 mm on each side of the glass.

(3) Individual panes of glass described in Sentence (1) shall not exceed 0.8 m^2 in area or 1 400 mm in height or width, and the area of glass not structurally supported by mullions shall not exceed 7.5 m^2.

9.10.13.6. Steel Door Frames

(1) Steel door frames forming part of a *closure* in a *fire separation*, including anchorage requirements, shall conform to CAN4-S105-M, "Fire Door Frames Meeting the Performance Required by CAN4-S104".

9.10.13.7. Glass Block as a Closure

(1) Glass block that has not been tested in accordance with Article 9.10.3.1. is permitted as a *closure* in a *fire separation* required to have a *fire-resistance rating* of not more than 1 h.

9.10.13.8. Maximum Size of Opening

(1) The size of an opening in an interior *fire separation*, even where protected with a *closure*, shall not exceed 11 m^2, with no dimension greater than 3.7 m, if a *fire compartment* on either side of the *fire separation* is not *sprinklered.*

(2) The size of an opening in an interior *fire separation*, even where protected with a *closure*, shall not exceed 22 m^2, with no dimension greater than 6 m, when the *fire compartments* on both sides of the *fire separation* are *sprinklered.*

9.10.13.9. Door Latch

(1) Every swing type door in a *fire separation* shall be equipped with a latch.

9.10.13.10. Self-Closing Device

(1) Except as described in Sentence (2), every door in a *fire separation* shall have a self-closing device.

(2) Self-closing devices are not required between *public corridors* and *suites* in *business and personal services occupancies*, except in,

(a) dead-end corridors, or

(b) a corridor that serves a *hotel.*

9.10.13.11. Hold-Open Devices

(1) Where hold-open devices are used on doors in required *fire separations*, they shall be installed in accordance with Article 3.1.8.12.

9.10.13.12. Service Room Doors

(1) Swing-type doors shall open into *service rooms* containing fuel-fired equipment where such doors lead to *public corridors* or rooms used for assembly but shall swing outward from such rooms in all other cases.

9.10.13.13. Fire Dampers

(1) Except as permitted in Sentences (2) to (5) and Sentence 9.10.5.1.(4), a duct that penetrates an assembly required to be a *fire separation* with a *fire-resistance rating* shall be equipped with a *fire damper* in conformance with Articles 3.1.8.4. and 3.1.8.9.

(2) A *fire damper* is not required where a *noncombustible* branch duct pierces a required *fire separation* provided the duct,

(a) has a melting point not below 760°C,

(b) has a cross-sectional area less than 0.013 m^2, and

(c) supplies only *air-conditioning* units or combined *air-conditioning* and heating units discharging air at not more than 1 200 mm above the floor.

(3) A *fire damper* is not required where a *noncombustible* branch duct pierces a required *fire separation* around an *exhaust duct* riser in which the air flow is upward provided,

(a) the melting point of the branch duct is not below 760°C,

(b) the branch duct is carried up inside the riser at least 500 mm, and

(c) the *exhaust duct* is under negative pressure as described in Article 9.10.9.18.

(4) *Noncombustible* ducts that penetrate a *fire separation* separating a *vertical service space* from the remainder of the *building* need not be equipped with a *fire damper* at the *fire separation* provided,

(a) the ducts have a melting point above 760°C, and

(b) each individual duct exhausts directly to the outside at the top of the *vertical service space*.

(5) A duct serving commercial cooking equipment and piercing a required *fire separation* need not be equipped with a *fire damper* at the *fire separation*.

9.10.13.14. Fire Stop Flaps

(1) *Fire stop flaps* in ceiling membranes required in Sentence 9.10.5.1.(4) shall be constructed in conformance with Supplementary Standard SB-2.

9.10.13.15. Doors Between Garages and Dwelling Units

(1) A door between an attached or built-in garage and a *dwelling unit* shall be tight-fitting and weatherstripped to provide an effective barrier against the passage of gases and exhaust fumes and shall be fitted with a self-closing device.

(2) A doorway between an attached or built-in garage and a *dwelling unit* shall not be located in a room intended for sleeping.

9.10.13.16. Door Stops

(1) Where a door is installed so that it may damage the integrity of a *fire separation* if its swing is unrestricted, door stops shall be installed to prevent such damage.

9.10.14. Spatial Separation Between Buildings

9.10.14.1. Application

(1) Except as permitted in Subsection 9.10.15., this Subsection applies to all *buildings*.

9.10.14.2. Area and Location of Exposing Building Face

(1) The area of an *exposing building face* shall be,

(a) taken as the exterior wall area facing in one direction on any side of a *building*, and

(b) calculated as,

  (i) the total area measured from the finished ground level to the uppermost ceiling, or

  (ii) the area for each *fire compartment* where a *building* is divided into *fire compartments* by *fire separations* with *fire-resistance ratings* not less than 45 min.

(2) For the purpose of using Table 9.10.14.4. to determine the maximum aggregate area of *unprotected openings* permitted in an irregularly-shaped or skewed exterior wall, the location of the *exposing building face* shall be taken as a vertical plane located so that there are no *unprotected openings* between the vertical plane and the line to which *limiting distance* is measured.

(3) For the purpose of using Table 9.10.14.5. to determine the required type of construction, cladding and *fire-resistance rating* for an irregularly-shaped or skewed exterior wall,

(a) the *exposing building face* is permitted to be divided into any number of portions and the *fire-resistance rating*, type of cladding and percentage of *unprotected openings* limitations is permitted to be determined individually for each portion based on the *limiting distance* for each portion so divided,

(b) the *exposing building face* shall be taken as the projection of the exterior wall onto a vertical plane located so that no portion of the exterior wall of the *building* is between the vertical plane and the line to which the *limiting distance* is established in Clause (a), and

(c) for the purpose of determining the actual area of *unprotected openings* permitted in an exterior wall, the *unprotected openings* shall be projected onto the vertical plane established in Clause (b).

(4) The required *limiting distance* for an *exposing building face* is permitted to be measured to a point beyond the property line that is not the centre line of a *street*, lane or public thoroughfare if,

(a) the owners of the properties on which the *limiting distance* is measured and the *municipality* enter into an agreement in which such owners agree that,

(i) each owner covenants that, for the benefit of land owned by the other covenantors, the owner will not *construct* a *building* on his or her property unless the *limiting distance* for *exposing building faces* in respect of the proposed *construction* is measured in accordance with the agreement,

(ii) the covenants contained in the agreement are intended to run with the lands, and the agreement shall be binding on the parties and their respective heirs, executors, administrators, successors and assigns,

(iii) the agreement shall not be amended or deleted from title without the consent of the *municipality*, and

(iv) they will comply with such other conditions as the *municipality* considers necessary, including indemnification of the *municipality* by the other parties, and

(b) the agreement referred to in Clause (a) is registered against the title of the properties to which it applies.

(5) Where an agreement referred to in Sentence (4) is registered against the title of a property, the *limiting distance* for *exposing building faces* in respect of the *construction* of any *buildings* on the property shall be measured to the point referred to in the agreement.

9.10.14.3. Inadequate Fire Fighting Facilities

(1) Where there is no fire department or where a fire department is not organized, trained and equipped to meet the needs of the community, the required *limiting distance* determined from Sentences 9.10.14.4.(2), (5) and (6) and Sentence 9.10.14.5.(6), shall be doubled for a *building* that is not *sprinklered*.

9.10.14.4. Openings in Exposing Building Face

(1) Except as provided in Sentences (3) to (7) and Sentence 9.10.14.6.(1), the maximum aggregate area of *unprotected openings* in an *exposing building face* shall,

(a) conform to Table 9.10.14.4.,

(b) conform to Subsection 3.2.3., or

(c) be equal to or less than,

(i) the *limiting distance* squared, for *residential occupancies*, *business and personal services occupancies* and *low hazard industrial occupancies*, and

(ii) twice the *limiting distance* squared, for *mercantile occupancies* and *medium hazard industrial occupancies*.

Table 9.10.14.4.
Maximum Aggregate Area of Unprotected Openings in Exterior Walls

Forming Part of Sentence 9.10.14.4.(1)

COLUMN 1	COLUMN 2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Occupancy Classification of *Building*	Maximum Total Area of *Exposing Building Face*, m²	Maximum Aggregate Area of *Unprotected Openings*, % of *Exposing Building Face* Area													
		Limiting Distance, m													
		Less than 1.2	1.2	1.5	2	2.5	3	4	6	8	10	12	16	20	25
Residential, business and personal services and *low-hazard industrial*	10	0	8	12	21	33	55	96	100	—	—	—	—	—	—
	15	0	8	10	17	25	37	67	100	—	—	—	—	—	—
	20	0	8	10	15	21	30	53	100	—	—	—	—	—	—
	25	0	8	9	13	19	26	45	100	—	—	—	—	—	—
	30	0	7	9	12	17	23	39	88	100	—	—	—	—	—
	40	0	7	8	11	15	20	32	69	100	—	—	—	—	—
	50	0	7	8	10	14	18	28	57	100	—	—	—	—	—
	100	0	7	8	9	11	13	18	34	56	84	100	—	—	—
	Over 100	0	7	7	8	9	10	12	19	28	40	55	92	100	—
Mercantile and medium-hazard industrial	10	0	4	6	10	17	25	48	100	—	—	—	—	—	—
	15	0	4	5	8	13	18	34	82	100	—	—	—	—	—
	20	0	4	5	7	11	15	27	63	100	—	—	—	—	—
	25	0	4	5	7	9	13	22	51	94	100	—	—	—	—
	30	0	4	4	6	9	12	20	44	80	100	—	—	—	—
	40	0	4	4	6	8	10	16	34	61	97	100	—	—	—
	50	0	4	4	5	7	9	14	29	50	79	100	—	—	—
	100	0	4	4	4	5	6	9	17	28	42	60	100	—	—
	Over 100	0	4	4	4	4	5	6	10	14	20	27	46	70	100

(2) Openings in a wall having a *limiting distance* of less than 1.2 m shall be protected by *closures*, of other than wired glass or glass block, whose *fire protection rating* is in conformance with the *fire-resistance rating* required for the wall.

(3) The maximum aggregate area of *unprotected openings* shall be not more than twice the area determined according to Sentence (1) where the *unprotected openings* are glazed with,

(a) wired glass in steel frames as described in Article 9.10.13.5., or

(b) glass blocks, as described in Article 9.10.13.7.

(4) Where the *building* is *sprinklered*, the maximum aggregate area of *unprotected openings* shall be not more than twice the area determined according to Sentence (1) provided all rooms, including closets and bathrooms, that are adjacent to the *exposing building face* and that have *unprotected openings* are *sprinklered*, notwithstanding any exemptions in the sprinkler standards referenced in Article 3.2.5.13.

(5) The maximum aggregate area of *unprotected openings* in an *exposing building face* of a *storage garage* need not comply with Sentence (1) where,

(a) all *storeys* are constructed as *open-air storeys*, and

(b) the *storage garage* has a *limiting distance* of not less than 3 m.

(6) The maximum aggregate area of *unprotected openings* in an *exposing building face* of a *storey* that faces a *street* and is the same level as the *street* need not comply with Sentence (1) where the *limiting distance* is not less than 9 m.

(7) The limits on area of *unprotected openings* need not apply to the *exposing building face* of a detached garage or accessory *building* facing a *dwelling unit*, where,

(a) the detached garage or accessory *building* serves a single *dwelling unit*,

(b) the detached garage or accessory *building* is located on the same property as that *dwelling unit*, and

(c) the *dwelling unit* served by the detached garage or accessory *building* is the only *major occupancy* on the property.

9.10.14.5. Construction of Exposing Building Face and Walls above Exposing Building Face

(1) Except as permitted in Sentences (2) to (7), each *exposing building face* and any exterior wall located above an *exposing building face* that encloses an *attic or roof space* shall be constructed in conformance with Table 9.10.14.5. and Subsection 9.10.8.

Table 9.10.14.5.
Minimum Construction Requirements for Exposing Building Faces

Forming Part of Sentence 9.10.14.5.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5
Occupancy Classification of *Building*	Maximum Area of *Unprotected Openings* Permitted, % of *Exposing Building Face* Area	Minimum Required *Fire-Resistance Rating*	Type of Construction Required	Type of Cladding Required
Residential, business and personal services, and *low-hazard industrial*	0 - 10	1 h	*Noncombustible*	*Noncombustible*
	>10 but ≤25	1 h	*Combustible* or *noncombustible*	*Noncombustible*
	>25 but <100	45 min	*Combustible* or *noncombustible*	*Combustible* or *noncombustible*
Mercantile and *medium-hazard industrial*	0 - 10	2 h	*Noncombustible*	*Noncombustible*
	>10 but ≤25	2 h	*Combustible* or *noncombustible*	*Noncombustible*
	>25 but <100	1 h	*Combustible* or *noncombustible*	*Combustible* or *noncombustible*

(2) Cladding on *exposing building faces* and exterior walls located above *exposing building faces* need not conform to the type of cladding required by Table 9.10.14.5. where,

(a) the *exposing building face* is constructed with no *unprotected openings*,

(b) the *limiting distance* is not less than 0.6 m, and

(c) the cladding,

(i) conforms to Subsection 9.27.13.,

(ii) is installed without furring members over not less than 12.7 mm thick gypsum sheathing or over masonry,

(iii) has a *flame-spread rating* not more than 25 when tested in accordance with Sentence 3.1.12.1.(2), and

(iv) is not more than 2 mm in thickness exclusive of fasteners, joints and local reinforcements.

(3) Except as provided in Sentence (4), where a garage or accessory *building* serves a single *dwelling unit* and is detached from any *building*, the *exposing building face*,

(a) need not conform to the minimum required *fire-resistance rating* in Table 9.10.14.5., where the *limiting distance* is 0.6 m or more,

(b) shall have a *fire-resistance rating* of not less than 45 min where the *limiting distance* is less than 0.6 m, and

(c) need not conform to the type of cladding required in Table 9.10.14.5. regardless of the *limiting distance*.

(4) The requirements for *fire-resistance rating*, type of construction and type of cladding need not apply to the *exposing building faces* of a *dwelling unit* and a detached garage or accessory *building* that face each other, where,

(a) the detached garage or accessory *building* serves a single *dwelling unit*,

(b) the detached garage or accessory *building* is located on the same property as that *dwelling unit*, and

(c) the *dwelling unit* served by the detached garage or accessory *building* is the only *major occupancy* on the property.

(5) Except for *buildings* containing 1 or 2 *dwelling units* only, *combustible* projections on the exterior of a wall that are more than 1 000 mm above ground level, such as balconies, platforms, *canopies*, eave projections and stairs, and that could expose an adjacent *building* to fire spread, shall not be permitted within,

(a) 1.2 m of a property line or the centre line of a *public way*, or

(b) 2.4 m of a *combustible* projection on another *building* on the same property.

(6) Heavy timber and steel columns need not conform to the requirements of Sentence (1) provided the *limiting distance* is not less than 3 m.

(7) Non-*loadbearing* wall components need not have a minimum *fire-resistance rating* where,

(a) the *building* is 1 *storey* in *building height*,

(b) the *building* is of *noncombustible construction*,

(c) the *building* is classified as *low hazard industrial occupancy* and is used only for low *fire load occupancies* such as power generating plants or plants for the manufacture or storage of *noncombustible* materials, and

(d) the *exposing building face* has a limiting distance of 3 m or more.

9.10.14.6. Minor Openings in Exposing Building Face

(1) An opening in an *exposing building face* not more than 130 cm^2 shall not be considered an *unprotected opening*.

9.10.15. Spatial Separation Between Houses

9.10.15.1. Application

(1) This Subsection applies to *buildings* that,

(a) contain only *dwelling units* and have no *dwelling unit* above another *dwelling unit*, and

(b) are not designed in accordance with Subsection 9.10.14.

9.10.15.2. Area and Location of Exposing Building Face

(1) The area of an *exposing building face* shall be,

(a) taken as the exterior wall area facing in one direction on any side of a *building*, and

(b) calculated as,

  (i) the total area measured from the finished ground level to the uppermost ceiling,

  (ii) the area for each *fire compartment* where a *building* is divided into *fire compartments* by *fire separations* with *fire-resistance ratings* not less than 45 min, or

  (iii) where Table 9.10.15.4. is used to determine maximum area of glazed openings, the area of any number of individual vertical portions of the wall measured from the finished ground level to the uppermost ceiling.

(2) For the purpose of using Table 9.10.15.4. to determine the maximum permitted area of glazed openings in an irregularly-shaped or skewed exterior wall, the location of the *exposing building face* shall be taken as a vertical plane located so that there are no glazed openings between the vertical plane and the line to which the *limiting distance* is measured.

(3) For the purpose of using Table 9.10.15.5. to determine the required type of construction, cladding and *fire-resistance rating* for an irregularly-shaped or skewed exterior wall,

(a) the location of the *exposing building face* shall be taken as a vertical plane located so that no portion of the actual *exposing building face* is between the vertical plane and the line to which the *limiting distance* is measured, and

(b) the value for the maximum aggregate area of glazed openings in Table 9.10.15.5. shall be determined using the *limiting distance* measured from the location described in Clause (a).

(4) The required *limiting distance* for an *exposing building face* is permitted to be measured to a point beyond the property line that is not the centre line of a *street*, lane or public thoroughfare if,

(a) the owners of the properties on which the *limiting distance* is measured and the *municipality* enter into an agreement in which such owners agree that,

(i) each owner covenants that, for the benefit of land owned by the other covenantors, the owner will not *construct* a *building* on his or her property unless the *limiting distance* for *exposing building faces* in respect of the proposed *construction* is measured in accordance with the agreement,

(ii) the covenants contained in the agreement are intended to run with the lands, and the agreement shall be binding on the parties and their respective heirs, executors, administrators, successors and assigns,

(iii) the agreement shall not be amended or deleted from title without the consent of the *municipality*, and

(iv) they will comply with such other conditions as the *municipality* considers necessary, including indemnification of the *municipality* by the other parties, and

(b) the agreement referred to in Clause (a) is registered against the title of the properties to which it applies.

(5) Where an agreement referred to in Sentence (4) is registered against the title of a property, the *limiting distance* for *exposing building faces* in respect of the *construction* of any *buildings* on the property shall be measured to the point referred to in the agreement.

9.10.15.3. Inadequate Firefighting Facilities

(1) Where there is no fire department or where a fire department is not organized, trained and equipped to meet the needs of the community, the required *limiting distance* determined from Sentences 9.10.15.4.(2), (5) and (6) and Sentence 9.10.15.5.(6), shall be doubled for a *building* that is not *sprinklered*.

9.10.15.4. Glazed Openings in Exposing Building Face

(1) Except as provided in Sentences (3) to (5), the maximum area of glazed openings in an *exposing building face* shall,

(a) conform to Table 9.10.15.4.,

(b) conform to Subsection 3.2.3., or

(c) be equal to or less than the *limiting distance* squared.

(2) Where the *exposing building face* is divided into individual portions as described in Subclause 9.10.15.2.(1)(b)(iii),

(a) the maximum glazed area of each individual portion shall be determined in accordance with Sentence (1),

(b) the maximum aggregate glazed area for the entire *exposing building face* shall be the sum of the individual maximum glazed areas determined from Clause (a), and

(c) except as required in Sentence (4), the maximum aggregate glazed area determined in Clause (b) is permitted to be distributed anywhere on the *exposing building face*.

(3) The limits on area of glazed openings shall not apply to the *exposing building face* of a *dwelling unit* facing a detached garage or accessory *building* where,

(a) the detached garage or accessory *building* serves only one *dwelling unit*,

(b) the detached garage or accessory *building* is located on the same property as that *dwelling unit*, and

(c) the *dwelling unit* served by the detached garage or accessory *building* is the only *major occupancy* on the property.

(4) Except as permitted in Sentence (5), openings in a wall having a *limiting distance* of less than 1.2 m shall be protected by *closures*, of other than wired glass or glass block, whose *fire-protection rating* is in conformance with the *fire-resistance rating* required for the wall.

(5) An opening in an *exposing building face* not more than 130 cm^2 shall not be considered an *unprotected opening*.

Table 9.10.15.4.
Maximum Area of Glazed Openings in Exterior Walls of Buildings Containing Only Dwelling Units

Forming Part of Sentence 9.10.15.4.(1)

COLUMN 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Maximum Total Area of *Exposing Building Face*, m²	Maximum Aggregate Area of Glazed Openings, % of *Exposing Building Face* Area													
	Limiting Distance, m													
	Less than 1.2	1.2	1.5	2	2.5	3	4	6	8	10	12	16	20	25
10	0	8	12	21	33	55	96	100	—	—	—	—	—	—
15	0	8	10	17	25	37	67	100	—	—	—	—	—	—
20	0	8	10	15	21	30	53	100	—	—	—	—	—	—
25	0	8	9	13	19	26	45	100	—	—	—	—	—	—
30	0	7	9	12	17	23	39	88	100	—	—	—	—	—
40	0	7	8	11	15	20	32	69	100	—	—	—	—	—
50	0	7	8	10	14	18	28	57	100	—	—	—	—	—
100	0	7	8	9	11	13	18	34	56	84	100	—	—	—
Over 100	0	7	7	8	9	10	12	19	28	40	55	92	100	—

9.10.15.5. Construction of Exposing Building Face of Houses

(1) Except as provided in Sentences (2) to (4) and (6), each *exposing building face* and any exterior wall located above an *exposing building face* that encloses an *attic or roof space* shall be constructed in conformance with Table 9.10.15.5. and Subsection 9.10.8.,

(a) for the *exposing building face* as a whole, or

(b) for any number of separate portions of the *exposing building face*.

(2) Sentence (1) does not apply where,

(a) the *limiting distance* is not less than1.2 m,

(b) the *limiting distance* is less than 1.2 m but not less than 0.6 m, provided that the *exposing building face* has a *fire-resistance rating* of not less than 45 min, or

(c) the *limiting distance* is less than 0.6 m, provided that the *exposing building face* has a *fire-resistance rating* of not less than 45 min and is clad with *noncombustible* material.

(3) Where the *limiting distance* is less than 0.6 m, cladding on the *exposing building face* and on exterior walls located above the *exposing building face* that enclose an *attic or roof spaces* need not be *noncombustible*, provided the cladding,

(a) conforms to Subsection 9.27.13.,

(b) is installed without furring members over not less than 12.7 mm thick gypsum sheathing or over masonry,

(c) has a *flame-spread rating* not more than 25 when tested in accordance with Sentence 3.1.12.1.(2), and

(d) is not more than 2 mm in thickness exclusive of fasteners, joints and local reinforcements.

(4) The requirements for *fire-resistance rating*, type of construction and type of cladding need not apply to the *exposing building faces* of a *dwelling unit* and a detached garage or accessory *building* that face each other, where,

(a) the detached garage or accessory *building* serves a single *dwelling unit*,

(b) the detached garage or accessory *building* is located on the same property as that *dwelling unit*, and

(c) the *dwelling unit* served by the detached garage or accessory *building* is the only *major occupancy* on the property.

(5) Except for *buildings* containing 1 or 2 *dwelling units* only, *combustible* projections on the exterior of a wall that are more than 1 000 mm above ground level, such as balconies, platforms, *canopies*, eave projections and stairs, and that could expose an adjacent *building* to fire spread, shall not be permitted within,

(a) 1.2 m of a property line or the centre line of a *public way*, or

(b) 2.4 m of a *combustible* projection on another *building* on the same property.

(6) Heavy timber and steel columns need not conform to the requirements of Sentence (1) provided the *limiting distance* is not less than 3 m.

Table 9.10.15.5.
Minimum Construction Requirements for Exposing Building Faces of Buildings Containing only Dwelling Units

Forming Part of Sentence 9.10.15.5.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
Maximum Area of Glazed Openings Permitted, % of *Exposing Building Face* Area	Minimum Required *Fire-Resistance Rating*	Type of Construction Required	Type of Cladding Required
0 - 10	1 h	*Noncombustible*	*Noncombustible*
>10 but ≤25	1 h	*Combustible* or *noncombustible*	*Noncombustible*
>25 but <100	45 min	*Combustible* or *noncombustible*	*Combustible* or *noncombustible*

9.10.16. Fire Stops

9.10.16.1. Required Fire Stops in Concealed Spaces

(1) Concealed spaces in interior walls, ceilings and crawl spaces shall be separated by fire stops from concealed spaces in exterior walls and *attic or roof spaces*.

(2) Fire stops shall be provided at all interconnections between concealed vertical and horizontal spaces in interior coved ceilings, drop ceilings and soffits where the exposed construction materials within the concealed spaces have a surface *flame-spread rating* greater than 25.

(3) Fire stops shall be provided at the top and bottom of each run of stairs where they pass through a floor containing concealed space in which the exposed construction materials within the space have a surface *flame-spread rating* greater than 25.

(4) In unsprinklered *buildings* of *combustible construction*, every concealed space created by a ceiling, roof space or unoccupied attic space shall be separated by fire stops into compartments of not more than not more than 300 m² in area where such space contains exposed construction materials having a surface *flame-spread rating* greater than 25.

(5) No dimension of the concealed space described in Sentence (4) shall exceed 20 m.

(6) Concealed spaces in mansard or gambrel style roofs, exterior cornices, balconies and canopies of *combustible construction* in which the exposed construction materials within the space have a surface *flame-spread rating* exceeding 25 shall have vertical fire stops at intervals of not more than 20 m and at points where such concealed spaces extend across the ends of required vertical *fire separations*.

9.10.16.2. Required Fire Stops in Wall Assemblies

(1) Except as permitted in Sentences (2) and (3), fire stops shall be provided to block off concealed spaces within wall assemblies, including spaces created by furring,

(a) at each floor level,

(b) at each ceiling level where the ceiling contributes to part of the required *fire-resistance rating*, and

(c) at other locations within the wall, so that the distance between fire stops does not exceed 20 m horizontally and 3 m vertically.

(2) Fire stops required in Sentence (1) are not required provided,

(a) the width of the concealed wall space does not exceed 25 mm,

(b) the exposed construction materials within the space are *noncombustible*, or

(c) the exposed construction materials within the space, including insulation, but not including wiring, piping or similar services, have a *flame-spread rating* of not more than 25.

(3) Fire stops required in Sentence (1) are not required provided the wall space is filled with insulation.

9.10.16.3. Fire Stop Materials

(1) Except as permitted in Sentence (2), fire stops shall be constructed of,

(a) not less than 0.38 mm sheet steel,

(b) not less than 6 mm asbestos board,

(c) not less than 12.7 mm gypsum wallboard,

(d) not less than 12.5 mm plywood, OSB or waferboard, with joints having continuous support,

(e) no fewer than 2 layers of 19 mm lumber with joints staggered,

(f) not less than 38 mm lumber, or

(g) materials conforming to Sentence 3.1.11.7.(1).

(2) In a *building* permitted to be of *combustible construction*, semi-rigid fibre insulation board produced from glass, rock or slag, is permitted to be used to block the vertical space in a double-frame wall assembly formed at the intersection of the floor assembly and the walls, provided the width of the vertical space is not more than 25 mm and the insulation board,

(a) has a density not less than 45 kg/m^3,

(b) is securely fastened to one set of studs,

(c) extends from below the bottom of the top plates in the lower *storey* to above the top of the bottom plate in the upper *storey*, and

(d) completely fills the nominal gap of 25 mm between the headers and between the wall plates.

9.10.16.4. Penetration of Fire Stops

(1) Where fire stops are pierced by pipes, ducts or other elements, the effectiveness of the fire stops shall be maintained around such elements.

9.10.17. Flame Spread Limits

9.10.17.1. Flame Spread Rating of Interior Surfaces

(1) Except as otherwise provided in this Subsection, the exposed surface of every interior wall and ceiling, including skylights and glazing, shall have a surface *flame-spread rating* of not more than 150.

(2) Except as permitted in Sentence (3), doors need not conform to Sentence (1) provided they have a surface *flame-spread rating* of not more than 200.

(3) Doors within *dwelling units*, other than vehicle garage doors, need not conform to Sentences (1) and (2).

9.10.17.2. Ceilings in Exits or Public Corridors

(1) At least 90% of the exposed surface of every ceiling in an *exit* or unsprinklered ceiling in a *public corridor* shall have a surface *flame-spread rating* of not more than 25.

9.10.17.3. Walls in Exits

(1) Except as provided in Sentence (2), at least 90% of the exposed surfaces of every wall in an *exit* shall have a surface *flame-spread rating* of not more than 25.

(2) At least 75% of the wall surface of a lobby used as an *exit* in Article 9.9.8.5. shall have a surface *flame-spread rating* of not more than 25.

9.10.17.4. Exterior Exit Passageways

(1) Where an exterior *exit* passageway provides the only *means of egress* from the rooms or *suites* it serves, the wall and ceiling finishes of that passageway, including the soffit beneath and the *guard* on the passageway, shall have a surface *flame-spread rating* of not more than 25, except that up to 10% of the total wall area and 10% of the total ceiling area is permitted to have a surface *flame-spread rating* of not more than 150.

9.10.17.5. Walls in Public Corridors

(1) At least 90% of the total wall surface in any unsprinklered *public corridor* shall have a surface *flame-spread rating* of not more than 75, or at least 90% of the upper half of such walls shall have a surface *flame-spread rating* of not more than 25.

9.10.17.6. Calculation of Wall and Ceiling Areas

(1) Skylights, glazing, *combustible* doors, and *combustible* light diffusers and lenses shall not be considered in the calculation of wall and ceiling areas in this Subsection.

9.10.17.7. Corridors Containing an Occupancy

(1) Where a *public corridor* or a corridor used by the public contains an *occupancy*, the interior finish materials used on the walls or ceiling of such *occupancy* shall have a surface *flame-spread rating* in conformance with that required for *public corridors*.

9.10.17.8. Light Diffusers and Lenses

(1) Light diffusers and lenses having *flame-spread ratings* that exceed those permitted for the ceiling finish, shall conform to the requirements of Sentence 3.1.13.4.(1).

9.10.17.9. Combustible Skylights

(1) Individual *combustible* skylights in corridors required to be separated from the remainder of the *building* by *fire separations* shall not exceed 1 m² in area and shall be spaced not less than 1 200 mm apart.

9.10.17.10. Protection of Foamed Plastics

(1) Except as provided in Sentence (2), foamed plastics that form part of a wall or ceiling assembly in *combustible construction* shall be protected from adjacent space in the *building* other than adjacent concealed spaces within *attic or roof spaces*, crawl spaces, and wall assemblies, by,

(a) one of the finishes described in Subsections 9.29.4. to 9.29.9.,

(b) sheet metal mechanically fastened to the supporting assembly independent of the insulation and having a thickness of not less than 0.38 mm and a melting point not below 650°C provided the building does not contain a Group C *major occupancy*, or

(c) any thermal barrier that meets the requirements of Clause 3.1.5.11.(2)(e).

(2) Foamed plastic insulation having a *flame-spread rating* of not more than 500 is permitted to be used in factory-assembled doors in *storage garages* serving *buildings* of *residential occupancy* provided that,

(a) the insulation is covered on the interior with a metallic foil,

(b) the assembly has a surface *flame-spread rating* of not more than 200, and

(c) the assembly incorporates no air spaces.

9.10.17.11. Walls and Ceilings in Bathrooms

(1) The interior finish of walls and ceilings in bathrooms within *suites* of *residential occupancy* shall have a surface *flame-spread rating* of not more than 200.

9.10.17.12. Coverings or Linings of Ducts

(1) Where a covering or a lining is used with a duct, such lining or covering shall have a *flame-spread rating* conforming to Part 6.

9.10.18. Alarm and Detection Systems

9.10.18.1. Access Provided through a Firewall

(1) Where access is provided through a *firewall*, the requirements in this Subsection shall apply to the *floor areas* on both sides of the *firewall* as if they were in the same *building*.

9.10.18.2. Fire Alarm System Required

(1) Except as provided in Sentence (2), a fire alarm system shall be installed,

(a) in every *building* that contains more than 3 *storeys*, including *storeys* below the *first storey*,

(b) where the total *occupant load* exceeds 300, or

(c) when the *occupant load* for any *major occupancy* in Table 9.10.18.2. is exceeded.

(2) A fire alarm system is not required in a *residential occupancy* where an *exit* or *public corridor* serves not more than 4 *suites* or where each *suite* has direct access to an exterior *exit* facility leading to ground level.

Table 9.10.18.2.
Maximum Occupant Load for Buildings without Fire Alarm Systems

Forming Part of Sentence 9.10.18.2.(1)

COLUMN 1	COLUMN 2
Major Occupancy Classification	*Occupant Load* Above which Fire Alarm System is Required
Residential	10 (sleeping accommodation)
Business and personal services, mercantile	150 above or below the *first storey*
Low- or *medium-hazard industrial*	75 above or below the *first storey*

9.10.18.3. Rooms and Spaces Requiring Heat Detectors or Smoke Detectors

(1) Where a fire alarm system is required, every *public corridor* in *buildings* of *residential occupancy* and every *exit* stair shaft shall be provided with *smoke detectors*.

(2) Except as provided in Sentence (3), *buildings* required to have a fire alarm system shall be equipped with *heat detectors* or *smoke detectors* in storage rooms, *service rooms*, elevator shafts, chutes, janitors closets and any other rooms where hazardous substances are intended to be used or stored.

(3) Except as required in Sentence (4), *heat detectors* and *smoke detectors* described in Sentence (2), are not required in *dwelling units* or in *sprinklered buildings* in which the sprinkler system is electrically supervised and equipped with a water flow alarm.

(4) Where a fire alarm system is required in a *hotel*, *heat detectors* shall be installed in every room in a *suite* and in every room not located in a *suite* in a *floor area* containing a *hotel* other than washrooms within a *suite*, saunas, refrigerated areas and swimming pools.

9.10.18.4. Smoke Detectors in Recirculating Air Handling Systems

(1) Except for a recirculating air system serving not more than 1 *dwelling unit*, where a fire alarm system is required to be installed, every recirculating air handling system shall be designed to prevent the circulation of smoke upon a signal from a duct-type *smoke detector* where such system supplies more than one *suite* on the same floor or serves more than 1 *storey*.

9.10.18.5. Portions of Buildings Considered as Separate Buildings

(1) Except as provided in Sentence (2), where a vertical *fire separation* having a *fire-resistance rating* of at least 1 h separates a portion of a *building* from the remainder of the *building* and there are no openings through the *fire separation* other than those for piping, tubing, wiring and conduit, the requirements for fire alarm and detection systems is permitted to be applied to each portion so separated as if it were a separate *building*.

(2) The permission in Sentence (1) to consider separated portions of a *building* as separate *buildings* does not apply to *service rooms* and storage rooms.

9.10.18.6. Design and Installation Requirements

(1) Fire alarm, fire detection and smoke detection devices and systems, and their installation, shall conform to Subsection 3.2.4.

9.10.18.7. Reserved

9.10.18.8. Open-Air Storage Garages

(1) Except as required in Article 9.10.18.1., a fire alarm system is not required in a *storage garage* conforming to Article 3.2.2.83. provided there are no other *occupancies* in the *building*.

9.10.18.9. Fire Alarm System in a Hotel

(1) If a fire alarm system is required in a *building* containing a *hotel*, a single stage fire alarm system shall be provided.

9.10.19. Smoke Alarms

9.10.19.1. Required Smoke Alarms

(1) *Smoke alarms* conforming to CAN/ULC-S531, "Smoke Alarms", shall be installed in each *dwelling unit* and in each sleeping room not within a *dwelling unit*.

9.10.19.2. Location of Smoke Alarms

(1) Within *dwelling units*, sufficient *smoke alarms* shall be installed so that,

(a) there is at least one *smoke alarm* on each floor level, including *basements*, that is 900 mm or more above or below an adjacent floor level,

(b) each bedroom is protected by a *smoke alarm* either inside the bedroom or, if outside, within 5 m, measured following corridors and doorways, of the bedroom door, and

(c) the distance, measured following corridors and doorways, from any point on a floor level to a *smoke alarm* on the same level does not exceed 15 m.

(2) *Smoke alarms* required in Article 9.10.19.1. and Sentence (1) shall be installed on or near the ceiling.

(3) *Smoke alarms* required in Sentences (1) and (2) shall be audible within the bedrooms when the intervening doors are closed.

(4) *Smoke alarms* required in Sentences (1) and (2) shall be installed in conformance with the manufacturers instructions.

9.10.19.3. Power Supply

(1) Except as permitted in Sentence (2), *smoke alarms* shall be installed by permanent connections to an electrical circuit and shall have no disconnect switch between the overcurrent circuit device and the *smoke alarm*.

(2) Where the *building* is not supplied with electrical power, *smoke alarms* are permitted to be battery operated.

9.10.19.4. Interconnection of Smoke Alarms

(1) Where more than one *smoke alarm* is required in a *dwelling unit*, the *smoke alarms* shall be wired so that the activation of one alarm will cause all alarms within the *dwelling unit* to sound.

9.10.19.5. Instructions for Maintenance and Care

(1) Where instructions are necessary to describe the maintenance and care required for *smoke alarms* to ensure continuing satisfactory performance, they shall be posted in a location where they will be readily available to the occupants for reference.

9.10.19.6. Silencing of Alarm Noise

(1) A manually operated device is permitted to be incorporated within the circuitry of a *smoke alarm* installed in a *dwelling unit* so that it will silence the signal emitted by the *smoke alarm* for a period of not more than 10 min, after which the *smoke alarm* will reset and again sound the alarm if the level of smoke in the vicinity is sufficient to reactuate the *smoke alarm*.

9.10.20. Firefighting

9.10.20.1. Windows or Access Panels Required

(1) Except as provided in Sentence (3), a window or access panel providing an opening not less than 1 100 mm high and 550 mm wide and having a sill height of not more than 900 mm above the floor shall be provided on the second and third *storeys* of every *building* in at least one wall facing on a *street* if such *storeys* are not *sprinklered*.

(2) Access panels required in Sentence (1) shall be readily openable from both inside and outside or be glazed with plain glass.

(3) Access panels required in Sentence (1) need not be provided in *buildings* containing only *dwelling units* where there is no *dwelling unit* above another *dwelling unit*.

9.10.20.2. Access to Basements

(1) Except in *basements* serving not more than one *dwelling unit*, each unsprinklered *basement* exceeding 25 m in length or width shall be provided with direct access to the outdoors to at least one *street*.

(2) Access required in Sentence (1) is permitted to be provided by a door, window or other means that provides an opening not less than 1 100 mm high and 550 mm wide, the sill height of which shall not be more than 900 mm above the floor.

(3) Access required in Sentence (1) is also permitted to be provided by an interior stair accessible from the outdoors.

9.10.20.3. Fire Department Access to Buildings

(1) Access for fire department equipment shall be provided to each *building* by means of a *street*, private roadway or yard

(2) Where access to a *building* as required in Sentence (1) is provided by means of a roadway or yard, the design and location of such roadway or yard shall take into account connection with public thoroughfares, weight of fire fighting equipment, width of roadway, radius of curves, overhead clearance, location of fire hydrants, location of fire department connections and vehicular parking.

9.10.20.4. Portable Extinguishers

(1) Portable extinguishers shall be installed in all *buildings*, except within *dwelling units*, in conformance with the provisions of the Fire Code made under the *Fire Protection and Prevention Act, 1997*.

9.10.20.5. Freeze Protection for Fire Protection Systems

(1) Equipment forming part of a fire protection system that may be adversely affected by freezing temperatures and that is located in an unheated area shall be protected from freezing.

9.10.21. Fire Protection for Construction Camps

9.10.21.1 Requirements for Construction Camps

(1) Except as provided in Articles 9.10.21.2. to 9.10.21.9., *camps for housing of workers* shall conform to Subsections 9.10.1. to 9.10.20.

9.10.21.2. Separation of Sleeping Rooms

(1) Except for sleeping rooms within *dwelling units*, sleeping rooms in a *building* in a *camp for housing of workers* shall be separated from each other and from the remainder of the *building* by a *fire separation* having not less than a 30 min *fire-resistance rating*.

9.10.21.3. Floor Assemblies Between the First and Second Storey

(1) Except in a *dwelling unit*, a floor assembly in a *building* in a *camp for housing of workers* separating the *first storey* and the second *storey* shall be constructed as a *fire separation* having not less than a 30 min *fire-resistance rating.*

9.10.21.4. Walkways Connecting Buildings

(1) Walkways of *combustible construction* connecting *buildings* shall be separated from each connected *building* by a *fire separation* having not less than a 45 min *fire-resistance rating.*

9.10.21.5. Spatial Separations

(1) *Buildings* in a *camp for housing of workers* shall be separated from each other by a distance of not less than 10 m unless otherwise permitted in Subsection 9.10.14.

9.10.21.6. Flame Spread Ratings

(1) Except in *dwelling units* and except as provided in Sentence (2), the surface *flame-spread rating* of wall and ceiling surfaces in corridors and *walkways*, exclusive of doors, shall not exceed 25 over not less than 90 per cent of the exposed surface area and not more than 150 over the remaining surface area.

(2) Except within *dwelling units*, corridors that provide *access to exit* from sleeping rooms and having a *fire-resistance rating* of not less than 45 min shall have a *flame-spread rating* conforming to the appropriate requirements in Subsection 9.10.16.

9.10.21.7. Smoke Detectors

(1) Except in *dwelling units*, corridors providing *access to exit* from sleeping rooms in every *building* in a *camp for housing of workers* with sleeping accommodation for more than 10 persons shall have a *smoke detector* connected to the *building* alarm system.

9.10.21.8. Portable Fire Extinguishers

(1) Each *building* in a *camp for housing of workers* shall be provided with portable fire extinguishers in conformance with the provisions of the Fire Code made under the *Fire Protection and Prevention Act, 1997.*

9.10.21.9. Hose Stations

(1) Every *building* in a *camp for housing of workers* providing sleeping accommodation for more than 30 persons shall be provided with a hose station that is protected from freezing and equipped with a hose of sufficient length so that every portion of the *building* is within the range of a hose stream.

(2) Hose stations required in Sentence (1) shall be located near an *exit.*

(3) Hoses referred to in Sentence (1) shall be not less than 19 mm inside diam and shall be connected to a central water supply or to a storage tank having a capacity of at least 4 500 L with a pumping system capable of supplying a flow of at least 5 L/s at a gauge pressure of 300 kPa.

9.10.22. Fire Protection for Gas, Propane and Electric Ranges

9.10.22.1. Installation of Ranges

(1) Reserved

(2) Clearances for and protection around gas, propane and electric *ranges* shall be not less than those provided in Articles 9.10.22.2. and 9.10.22.3.

9.10.22.2. Vertical Clearances above Ranges

(1) Except as provided in Sentence (2), framing, finishes and cabinetry installed directly above the location of the *range* shall be not less than 750 mm above the level of *range* burners or elements.

(2) The vertical clearance described in Sentence (1) for framing, finishes and cabinets located directly above the location of the *range* is permitted to be reduced to 600 mm above the level of the elements or burners provided the framing, finishes and cabinets,

(a) are *noncombustible*, or

(b) are protected by,

    (i) asbestos millboard not less than 6 mm thick, covered with sheet metal not less than 0.33 mm thick, or

    (ii) a metal hood with a 125 mm projection beyond the framing, finishes and cabinets.

9.10.22.3. Protection Around Ranges

(1) Except as provided in Sentences (2) and (3), *combustible* wall framing, finishes or cabinets within 450 mm of the area where the *range* is to be located shall be protected above the level of the heating elements or burners by material providing fire resistance not less than that of a 9.5 mm thickness of gypsum board.

(2) Counter-top splash boards or back plates that extend above the level of the heating elements or burners need not be protected as described in Sentence (1).

(3) Except for cabinetry described in Article 9.10.22.2., cabinetry located not less than 450 mm above the level of the heating elements or burners need not be protected as described in Sentence (1).

Section 9.11. Sound Control

9.11.1. Sound Transmission Class Rating (Airborne Sound)

9.11.1.1. Determination of Sound Transmission Class Rating

(1) Sound transmission class ratings shall be determined in accordance with ASTM E413, "Classification for Rating Sound Insulation", using results from measurements in accordance with,

(a) ASTM E90, "Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements", or

(b) ASTM E336, "Measurement of Airborne Sound Insulation in Buildings".

9.11.2. Required Sound Control Locations (Airborne Sound)

9.11.2.1. Minimum Sound Transmission Class Rating

(1) Except as provided in Sentence (2), every *dwelling unit* and every *suite* in *hotels* shall be separated from every other space in a *building* in which noise may be generated, by a construction providing a sound transmission class rating of at least 50, measured in accordance with Subsection 9.11.1. or as listed in Tables 1.1 and 1.2 of Supplementary Standard SB-3.

(2) Where a *dwelling unit* or *suite* in a *hotel* is adjacent to an elevator shaft or a refuse chute, the separating construction shall have a sound transmission class rating of at least 55, measured in accordance with Subsection 9.11.1. or as listed in Tables 1.1 and 1.2 of Supplementary Standard SB-3.

9.11.2.2. Building Services in an Assembly

(1) *Building* services located in an assembly required to have a sound transmission class rating shall be installed in a manner that will not decrease the required rating of the assembly.

Section 9.12. Excavation

9.12.1. General

9.12.1.1. Removal of Topsoil and Organic Matter

(1) The topsoil and vegetable matter in all unexcavated areas under a *building* shall be removed.

(2) In localities where termite infestation is known to be a problem, all stumps, roots and other wood debris shall be removed from the soil to a depth of not less than 300 mm in unexcavated areas under a *building*.

(3) The bottom of every *excavation* shall be free of all organic material.

9.12.1.2. Standing Water

(1) *Excavations* shall be kept free of standing water.

9.12.1.3. Protection from Freezing

(1) The bottom of *excavations* shall be kept from freezing throughout the entire construction period.

9.12.1.4. Precautions During Excavation

(1) Every *excavation* shall be undertaken in such a manner to prevent damage to adjacent property, existing structures, utilities, roads and sidewalks at all stages of construction.

(2) Material shall not be placed nor shall equipment be operated or placed in or adjacent to an *excavation* in a manner that may endanger the integrity of the *excavation* or its supports.

9.12.2. Depth

9.12.2.1. Excavation to Undisturbed Soil

(1) *Excavations* for *foundations* shall extend to undisturbed *soil*.

9.12.2.2. Minimum Depth of Foundations

(1) Except as provided in Sentences (4) and (5), the minimum depth of *foundations* below finished ground level shall conform to Table 9.12.2.2.

Table 9.12.2.2.
Minimum Depths of Foundations

Forming Part of Sentence 9.12.2.2.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5
Type of *Soil*	Minimum Depth of *Foundation* Containing Heated *Basement* or Crawl Space(1)		Minimum Depth of *Foundation* Containing no Heated Space(2)	
	Good *Soil* Drainage(3)	Poor *Soil* Drainage	Good *Soil* Drainage(3)	Poor *Soil* Drainage
Rock	No limit	No limit	No limit	No limit
Coarse grained *soils*	No limit	No limit	No limit	Below the depth of frost penetration
Silt	No limit	No limit	Below the depth of frost penetration	Below the depth of frost penetration
Clay or *soils* not clearly defined	1.2 m	1.2 m	1.2 m but not less than the depth of frost penetration	1.2 m but not less than the depth of frost penetration

Notes to Table 9.12.2.2.:

(1) *Foundation* not insulated to reduce heat loss through the footings.

(2) Including *foundations* containing heated space insulated to reduce heat loss through the footings.

(3) Good *soil* drainage to not less than the depth of frost penetration.

(2) Where a *foundation* is insulated in a manner that will reduce the heat flow to the *soil* beneath the footings, the *foundation* depth shall conform to that required for *foundations* containing no heated space.

(3) The minimum depth of *foundations* for exterior concrete steps with more than 2 risers shall conform to Sentences (1), (2) and (5).

(4) Concrete steps with 1 and 2 risers are permitted to be laid on ground level.

(5) The *foundation* depths required in Sentence (1) are permitted to be decreased where experience with local *soil* conditions shows that lesser depths are satisfactory, or where the *foundation* is designed for lesser depths.

(6) The *foundation* depths required in Sentence (1) do not apply to *foundations* for,

(a) *buildings*,

  (i) that are not of masonry or masonry veneer construction, and

  (ii) whose superstructure conforms with the requirements of the deformation resistance test in CAN/CSA-Z240.2.1, "Structural Requirements for Mobile Homes", or

(b) accessory *buildings*,

  (i) that are not of masonry or masonry veneer construction.,

  (ii) not more than 1 *storey* in *building height*,

  (iii) not more than 55 m² in *building area*, and

  (iv) where the distance from the finished ground to the underside of the floor joists is not more than 600 mm.

(7) The *foundation* depths required in Sentence (1) do not apply to *foundations* for decks and other accessible exterior platforms,

(a) that are of not more than 1 storey,

(b) that are not more than 55 m² in area,

(c) where the distance from the finished ground to the underside of the floor joists is not more than 600 mm,

(d) that are not supporting a roof, and

(e) that are not attached to another structure, unless it can be demonstrated that differential movement will not adversely affect the performance of that structure.

9.12.3. Backfill

9.12.3.1. Placement of Backfill

(1) Backfill shall be placed to avoid damaging the *foundation* wall, the drainage tile, drainage layer, externally applied thermal insulation, waterproofing and dampproofing of the wall.

9.12.3.2. Grading of Backfill

(1) Backfill shall be graded to prevent drainage towards the *foundation* after settling.

9.12.3.3. Deleterious Debris and Boulders

(1) Backfill within 600 mm of the *foundation* shall be free of deleterious debris and boulders larger than 250 mm diam.

(2) Except as permitted in Sentence (3), backfill shall not contain pyritic material or material that is susceptible to ice lensing in concentrations that will damage the *building* to a degree that would adversely affect its stability or the performance of assemblies separating dissimilar environments.

(3) Backfill with material of any concentration that is susceptible to ice lensing is permitted where *foundation* walls are cast-in-place concrete, concrete block insulated on the exterior or concrete block protected from the backfill by a material that serves as a slip plane.

9.12.3.4. Lateral Support of Foundation Wall

(1) Where the height of *foundation* wall is such that lateral support is required, or where the required concrete strength of the wall has not been reached, the wall shall be braced or laterally supported before backfilling.

9.12.4. Trenches Beneath Footings

9.12.4.1. Compacting or Filling With Concrete

(1) The *soil* in trenches beneath footings for sewers and watermains shall be compacted by tamping up to the level of the footing base, or shall be filled with concrete having a strength not less than 10 MPa to support the footing.

Section 9.13. Dampproofing, Waterproofing and Soil Gas Control

9.13.1. General

9.13.1.1. Application

(1) This Section applies to the control of moisture and *soil* gas ingress through walls, floors, and roofs in contact with the ground.

9.13.2. Dampproofing

9.13.2.1. Dampproofing

(1) Except as provided in Article 9.13.3.1., where the exterior finished ground level is at a higher elevation than the ground level inside the *foundation* walls, exterior surfaces of *foundation* walls below ground level shall be dampproofed.

(2) Except as provided in Sentence (3) and Article 9.13.3.1., floors-on-ground shall be dampproofed.

(3) Floors in garages, floors in unenclosed portions of *buildings* and floors installed over granular *fill* in conformance with Article 9.16.2.1. need not be dampproofed.

(4) Dampproofing in Sentence (1) is not required where the exterior surfaces of *foundation* walls below ground level are waterproofed.

9.13.2.2. Material Standards

(1) Except as otherwise specified in this Section, materials used for exterior dampproofing shall conform to,

(a) CAN/CGSB-37.1-M, "Chemical Emulsified Type, Emulsified Asphalt for Dampproofing",

(b) CAN/CGSB-37.2-M, "Emulsified Asphalt, Mineral Colloid Type, Unfilled, for Dampproofing and Waterproofing and for Roof Coatings",

(c) CGSB 37-GP-6Ma, "Asphalt, Cutback, Unfilled, for Dampproofing",

(d) CAN/CGSB-37.16-M, "Filled, Cutback Asphalt for Dampproofing and Waterproofing",

(e) CGSB 37-GP-18Ma, "Tar, Cutback, Unfilled, for Dampproofing",

(f) CAN/CGSB-51.34-M, "Vapour Barrier, Polyethylene Sheet, for Use in Building Construction", or

(g) CAN/CSA-A123.4, "Asphalt for Constructing Built-Up Roof Coverings and Waterproofing Systems."

9.13.2.3. Standards for Application

(1) The method of application of all bituminous dampproofing materials shall conform to,

(a) CAN/CGSB 37.3-M, "Application of Emulsified Asphalts for Dampproofing or Waterproofing",

(b) CGSB 37-GP-12Ma, "Application of Unfilled Cutback Asphalt for Dampproofing", or

(c) CAN/CGSB-37.22-M, "Application of Unfilled, Cutback Tar Foundation Coating for Dampproofing".

9.13.2.4. Preparation of Surface

(1) Unit masonry walls that are to be dampproofed shall be,

(a) parged on the exterior face below ground level with not less than 6 mm of mortar conforming to Section 9.20., and

(b) coved over the footing when the first course of block is laid.

(2) Concrete walls to be dampproofed shall have holes and recesses resulting from the removal of form ties sealed with cement mortar or dampproofing material.

(3) The surface of insulating concrete form walls that are to be dampproofed shall be repaired and free of projections and depressions that could lead to detrimental to the performance of the membrane to be applied.

9.13.2.5. Application of Dampproofing Material

(1) Dampproofing material shall be applied over the parging or concrete below ground level.

9.13.2.6. Interior Dampproofing of Walls

(1) Where a separate interior finish is applied to a concrete or unit masonry wall that is in contact with the *soil*, or where wood members are placed in contact with such walls for the installation of insulation or finish, the interior surface of the *foundation* wall below ground level shall be dampproofed.

(2) The dampproofing required in Sentence (1) shall extend from the *basement* floor and terminate at ground level.

(3) No membrane or coating with a permeance less than 170 ng/(Pa.s.m^2) shall be applied to the interior surface of the *foundation* wall above ground level between the insulation and the *foundation* wall.

9.13.2.7. Dampproofing of Floors-on-Ground

(1) Where floors are dampproofed, the dampproofing shall be installed below the floor, except that where a separate floor is provided over a slab, the dampproofing is permitted to be applied to the top of the slab.

(2) Where installed below the floor, dampproofing membranes shall consist of polyethylene not less than 0.15 mm thick, or type S roll roofing.

(3) Joints in dampproofing membranes described in Sentence (2) shall be lapped not less than 100 mm.

(4) Where installed above the slab, dampproofing shall consist of,

(a) no fewer than 2 mopped-on coats of bitumen,

(b) not less than 0.05 mm polyethylene, or

(c) other material providing equivalent performance.

9.13.2.8. Dampproofing of Preserved Wood Foundation Walls

(1) Preserved wood *foundation* walls shall be dampproofed as described in CAN/CSA-S406, "Construction of Preserved Wood Foundations".

9.13.3. Waterproofing

9.13.3.1. Required Waterproofing

(1) Where hydrostatic pressure occurs, waterproofing is required for exterior surfaces of,

(a) floors-on-ground, and

(b) below ground walls, where the exterior finished ground level is at a higher elevation than the ground level inside the *foundation* walls.

(2) Roofs of underground structures shall be waterproofed to prevent the entry of water into the structure.

9.13.3.2. Material Standards

(1) Except as otherwise specified in this Section, materials used for exterior waterproofing shall conform to,

(a) CAN/CGSB-37.2-M, "Emulsified Asphalt, Mineral-Colloid Type, Unfilled, for Dampproofing and Waterproofing and for Roof Coatings",

(b) CAN/CGSB-37.16-M, "Filled, Cutback Asphalt for Dampproofing and Waterproofing", or

(c) CAN/CSA-A123.4, "Asphalt for Constructing Built-Up Roof Coverings and Waterproofing Systems".

9.13.3.3. Standards for Application

(1) The method of application of all bituminous waterproofing materials shall conform to CAN/CGSB-37.3-M, "Application of Emulsified Asphalts for Dampproofing or Waterproofing".

9.13.3.4. Preparation of Surface

(1) Unit masonry walls that are to be waterproofed shall be parged on exterior surfaces below ground level with not less than 6 mm of mortar conforming to Section 9.20.

(2) Concrete walls that are to be waterproofed shall have all holes and recesses resulting from removal of form ties sealed with mortar or waterproofing material.

(3) The surface of insulating concrete form walls that are to be waterproofed shall be repaired and free of projections and depressions that could be detrimental to the performance of the membrane to be applied.

9.13.3.5. Application of Waterproofing Membranes

(1) Concrete or unit masonry walls to be waterproofed shall be covered with no fewer than 2 layers of bitumen-saturated membrane, with each layer cemented in place with bitumen and coated overall with a heavy coating of bitumen.

9.13.3.6. Floor Waterproofing System

(1) *Basement* floors-on-ground to be waterproofed shall have a system of membrane waterproofing provided between 2 layers of concrete, each of which shall be not less than 75 mm thick, with the floor membrane mopped to the wall membrane to form a complete seal.

9.13.4. Soil Gas Control

9.13.4.1. Soil Gas Control

(1) Where methane or radon gases are known to be a problem, construction shall comply with the requirements for *soil* gas control in Supplementary Standard SB-9.

9.13.4.2. Required Soil Gas Control

(1) Except as provided in Sentence (2), all wall, roof and floor assemblies in contact with the ground shall be constructed to resist the leakage of *soil* gas from the ground into the *building*.

(2) Construction to resist leakage of *soil* gas into the *building* is not required for,

(a) garages and unenclosed portions of *buildings*,

(b) *buildings* constructed in areas where it can be demonstrated that *soil* gas does not constitute a hazard, or

(c) *buildings* that contain a single *dwelling unit* and are constructed to provide for subfloor depressurization in accordance with Supplementary Standard SB-9.

(3) Where *soil* gas control is required, a *soil* gas barrier shall be installed at walls and roofs in contact with the ground according to Supplementary Standard SB-9.

(4) Where *soil* gas control is required, it shall consist of one of the following at floors in contact with the ground:

(a) a *soil* gas barrier installed according to Supplementary Standard SB-9 , or

(b) where the *building* contains a single *dwelling unit* only, a subfloor depressurization system installed according to Supplementary Standard SB-9.

9.13.4.3. Material Standards

(1) Materials used to provide a barrier to *soil* gas ingress through floors-on-ground shall conform to CAN/CGSB-51.34-M, “Vapour Barrier, Polyethylene Sheet, for Use in Building Construction”.

Section 9.14. Drainage

9.14.1. Scope

9.14.1.1. Application

(1) This Section applies to subsurface drainage and to surface drainage.

9.14.1.2. Crawl Spaces

(1) Drainage for crawl spaces shall conform to Section 9.18.

9.14.1.3. Floors-on-Ground

(1) Drainage requirements beneath floors-on-ground shall conform to Section 9.16.

9.14.2. Foundation Drainage

9.14.2.1. Foundation Wall Drainage

(1) Unless it can be shown to be unnecessary, drainage shall be provided at the bottom of every *foundation* wall that contains the *building* interior.

(2) Except as permitted in Sentences (4) to (6), where the insulation on a *foundation* wall extends to more than 900 mm below the adjacent exterior ground level,

(a) a drainage layer shall be installed adjacent to the exterior surface of a *foundation* wall consisting of,

(i) not less than 19 mm mineral fibre insulation with a density of not less than 57 kg/m^3 , or

(ii) not less than 100 mm of free draining granular material, or

(b) a system shall be installed that can be shown to provide equivalent performance to that provided by the materials described in Clause (a).

(3) Where mineral fibre insulation, crushed rock backfill or other drainage layer medium is provided adjacent to the exterior surface of a *foundation* wall,

(a) the insulation, backfill or other drainage layer medium shall extend to the footing level to facilitate drainage of ground water to the *foundation* drainage system, and

(b) any pyritic material in the crushed rock shall be limited to a concentration that will not damage the building to a degree that would adversely affect its stability or the performance of assemblies separating dissimilar environments.

(4) Except when the insulation provides the drainage layer required in Clause (2)(a), when exterior insulation is provided, the drainage layer shall be installed on the exterior face of the insulation.

(5) The drainage layer required in Sentence (2) is not required,

(a) when the *foundation* wall is not required to be dampproofed, or

(b) when the *foundation* wall is waterproofed.

(6) The drainage layer in Sentence (2) is only required where the *foundation* wall is constructed after the day this Regulation comes into force.

(7) Where drainage is required in Sentence (1), the drainage shall conform to Subsection 9.14.3. or 9.14.4.

9.14.3. Drainage Tile and Pipe

9.14.3.1. Material Standards

(1) Drain tile and drain pipe for *foundation* drainage shall conform to,

(a) ASTM C4, "Clay Drain Tile and Perforated Clay Drain Tile",

(b) ASTM C412M, "Concrete Drain Tile (Metric)",

(c) ASTM C444M, "Perforated Concrete Pipe (Metric)",

(d) ASTM C700, "Vitrified Clay Pipe, Extra Strength, Standard Strength and Perforated",

(e) CAN/CGSB-34.22, "Asbestos-Cement Drain Pipe",

(f) CAN/CSA-B182.1, "Plastic Drain and Sewer Pipe and Pipe Fittings",

(g) CSA G401, "Corrugated Steel Pipe Products", or

(h) NQ 3624-115, "Polythylene (PE) Pipe and Fittings – Flexible Corrugated Pipes for Drainage – Characteristics and Test Methods".

9.14.3.2. Minimum Size

(1) Drain tile or pipe used for *foundation* drainage shall be not less than 100 mm in diam.

9.14.3.3. Installation

(1) Drain tile or pipe shall be laid on undisturbed or well-compacted *soil* so that the top of the tile or pipe is below the bottom of the floor slab or crawl space.

(2) Drain tile or pipe with butt joints shall be laid with 6 mm to 10 mm open joints.

(3) The top half of joints referred to in Sentence (2) shall be covered with sheathing paper, 0.10 mm polyethylene or No.15 asphalt or tar-saturated felt.

(4) The top and sides of drain pipe or tile shall be covered with not less than 150 mm of crushed stone or other coarse clean granular material containing not more than 10% of material that will pass a 4 mm sieve.

9.14.4. Granular Drainage Layer

9.14.4.1. Type of Granular Material

(1) Granular material used to drain the bottom of a *foundation* shall consist of a continuous layer of crushed stone or other coarse clean granular material containing,

(a) not more than 10% of material that will pass a 4 mm sieve, and

(b) no pyritic material in a concentration that would adversely affect its stability or the performance of assemblies separating dissimilar environments.

9.14.4.2. Installation

(1) Granular material described in Article 9.14.4.1. shall be laid on undisturbed or compacted *soil* to a minimum depth of not less than 125 mm beneath the *building* and extend not less than 300 mm beyond the outside edge of the footings.

9.14.4.3. Grading

(1) The bottom of an *excavation* drained by a granular layer shall be graded so that the entire area described in Article 9.14.4.2. is drained to a sump conforming to Article 9.14.5.2.

9.14.4.4. Wet Site Conditions

(1) Where because of wet site conditions *soil* becomes mixed with the granular drainage material, sufficient additional granular material shall be provided so that the top 125 mm is kept free of *soil*.

9.14.5. Drainage Disposal

9.14.5.1. Drainage Disposal

(1) *Foundation* drains shall drain to a sewer, drainage ditch or dry well.

9.14.5.2. Sump Pits

(1) Where gravity drainage is not practical, a covered sump with an automatic pump shall be installed to discharge the water into a sewer, drainage ditch or dry well.

(2) Covers for sump pits shall be designed to resist removal by children.

9.14.5.3. Dry Wells

(1) Dry wells are permitted to be used only when located in areas where the natural *groundwater* level is below the bottom of the dry well.

(2) Dry wells shall be not less than 5 m from the *building foundation* and located so that drainage is away from the *building*.

9.14.6. Surface Drainage

9.14.6.1. Surface Drainage

(1) The *building* shall be located or the *building* site graded so that water will not accumulate at or near the *building* and will not adversely affect adjacent properties.

9.14.6.2. Drainage away from Wells or Septic Disposal Beds

(1) Surface drainage shall be directed away from the location of a water supply well or septic tank disposal bed.

9.14.6.3. Window Wells

(1) Every window well shall be drained to the footing level or other suitable location.

9.14.6.4. Catch Basin

(1) Where runoff water from a driveway is likely to accumulate or enter a garage, a catch basin shall be installed to provide adequate drainage.

9.14.6.5. Downspouts

(1) Downspouts shall conform to Article 9.26.18.2.

Section 9.15. Footings and Foundations

9.15.1. Application

9.15.1.1. General

(1) Except as provided in Articles 9.15.1.2. and 9.15.1.3., this Section applies to,

(a) concrete or unit masonry *foundation* walls and concrete footings not subject to surcharge,

  (i) on stable *soils* with an allowable bearing pressure of 75 kPa or greater, and

  (ii) for *buildings* of wood frame or masonry construction,

(b) wood frame *foundation* walls and wood or concrete footings not subject to surcharge,

  (i) on stable *soils* with an allowable bearing pressure of 75 kPa or greater, and

(ii) for *buildings* of wood frame construction, and

(c) flat insulating concrete form *foundation* walls and concrete footings not subject to surcharge,

(i) on stable *soils* with an allowable bearing pressure of 100 kPa or greater, and

(ii) for *buildings* of light frame or flat insulated concrete form construction that are not more than 2 *storeys* in *building height*, with a maximum floor to floor height of 3 m, and containing only a single *dwelling unit*.

(2) *Foundations* for applications other than as described in Sentence (1) shall be designed in accordance with Section 9.4.

(3) Where a *foundation* is erected on filled ground, peat or sensitive clay, the footing sizes shall be designed in conformance with Section 4.2.

(4) For the purpose of Sentence (3), sensitive clay means the grain size of the majority of the particles is smaller than 0.002 mm, including leda clay.

9.15.1.2. Permafrost

(1) *Buildings* erected on permafrost shall have *foundations* designed by a *designer* competent in this field in accordance with the appropriate requirements of Part 4.

9.15.1.3. Foundations for Deformation Resistant Buildings

(1) Where the superstructure of a detached *building* conforms to the requirements of the deformation resistance test in CAN/CSA-Z240.2.1, "Structural Requirements for Mobile Homes", the *foundation* shall be constructed in conformance with,

(a) the remainder of this Section, or

(b) CSA Z240.10.1, "Site Preparation, Foundation, and Anchorage of Mobile Homes".

9.15.2. General

9.15.2.1. Concrete

(1) Concrete shall conform to Section 9.3.

9.15.2.2. Unit Masonry Construction

(1) Concrete block shall conform to CSA A165.1, "Concrete Block Masonry Units", and shall have a compressive strength over the average net cross-sectional area of the block of not less than 15 MPa.

(2) Mortar, grout, mortar joints, corbelling and protection for unit masonry shall conform to Section 9.20.

(3) For concrete block *foundation* walls required to be reinforced,

(a) mortar shall be Type S, conforming to CSA A179, "Mortar and Grout for Unit Masonry",

(b) grout shall be coarse, conforming to CSA A179, "Mortar and Grout for Unit Masonry", and

(c) placement of grout shall conform to CSA A371, "Masonry Construction for Buildings".

9.15.2.3. Pier Type Foundations

(1) Where pier type *foundations* are used, the piers shall be designed to support the applied loads from the superstructure.

(2) Where piers are used as a *foundation* system in a *building* of 1 *storey* in *building height*, the piers shall be installed to support the principal framing members and shall be spaced not more than 3.5 m apart along the framing, unless the piers and their footings are designed for larger spacings.

(3) The height of piers described in Sentence (2) shall not exceed 3 times their least dimension at the base of the pier.

(4) Where concrete block is used for piers described in Sentence (2), they shall be laid with cores placed vertically, and where the width of the *building* is 4.3 m or less, placed with their longest dimension at right angles to the longest dimension of the *building*.

9.15.2.4. Wood Frame Foundations

(1) *Foundations* of wood frame construction shall conform to,

(a) CAN/CSA-S406, "Construction of Preserved Wood Foundations", or

(b) Part 4.

9.15.3. Footings

9.15.3.1. Footings Required

(1) Footings shall be provided under walls, pilasters, columns, piers, fireplaces and *chimneys* that bear on *soil* or *rock*, except that footings are permitted to be omitted under piers or monolithic concrete walls if the safe *loadbearing* capacity of the *soil* or *rock* is not exceeded.

9.15.3.2. Support of Footings

(1) Footings shall rest on undisturbed *soil*, *rock* or compacted granular *fill*.

(2) Granular fill shall not contain pyritic material in a concentration that would adversely affect its stability or the performance of assemblies separating dissimilar environments.

9.15.3.3. Application of Footing Width and Area Requirements

(1) Except as provided in Sentence 9.15.3.4.(2), the minimum footing width or area requirements provided in Articles 9.15.3.4. to 9.15.3.7. shall apply to footings where,

(a) the footings support,

  (i) *foundation* walls of masonry, concrete, or flat insulating form *foundation* walls,

  (ii) above ground walls of masonry, flat insulating form *foundation* walls or light wood frame construction, and

  (iii) floors and roofs of light wood frame construction,

(b) the span of supported joists does not exceed 4.9 m, and

(c) the specified *live load* on any floor supported by the footing does not exceed 2.4 kPa.

(2) Except as provided in Sentence 9.15.3.4.(2), where the span of the supported joists exceeds 4.9 m, footings shall be designed in accordance with Section 4.2.

(3) Where the specified *live load* exceeds 2.4 kPa footings shall be designed in accordance with Section 4.2.

9.15.3.4. Basic Footing Widths and Areas

(1) Except as provided in Sentences (2) and (3) and in Articles 9.15.3.5. to 9.15.3.7., the minimum footing width or area shall comply with Table 9.15.3.4.

(2) Where the supported joist span exceeds 4.9 m in *buildings* with light wood-framed walls, floors and roofs, footing widths shall be determined according to,

(a) Section 4.2., or

(b) the following formula:

$$W = w \cdot [\sum sjs / (\mathit{storeys} \cdot 4.9)]$$

where,

W = minimum footing width,

w = minimum width of footings supporting joists not exceeding 4.9 m, as defined by Table 9.15.3.4.,

$\sum sjs$ = the sum of the supported joist lengths on each *storey* whose load is transferred to the footing, and

storeys = number of *storeys* supported by the footing

(3) Where a *foundation* rests on gravel, sand or silt in which the water table level is less than the width of the footings below the *bearing surface*,

(a) the footing width for walls shall be not less than twice the width required by Sentences (1) and (2), and Articles 9.15.3.5. and 9.15.3.6., and

(b) the footing area for columns shall be not less than twice the area required by Sentences (1) and (2), and Article 9.15.3.7.

Table 9.15.3.4.
Minimum Footing Sizes

Forming Part of Sentence 9.15.3.4.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
Number of Floors Supported	Minimum Width of Strip Footings, mm		Minimum Footing Area for Columns Spaced 3 m o.c.(1), m^2
	Supporting Exterior Walls(2)	Supporting Interior Walls(3)	
1	250	200	0.40
2	350	350	0.75
3	450	500	1.0

Notes to Table 9.15.3.4.:

(1) See Sentence 9.15.3.7.(1).

(2) See Sentences 9.15.3.5.(1).

(3) See Sentence 9.15.3.6.(1).

9.15.3.5. Adjustments to Footing Widths for Exterior Walls

(1) The strip footing widths for exterior walls shown in Table 9.15.3.4. shall be increased by,

(a) 65 mm for each *storey* of masonry veneer over wood frame construction supported by the *foundation* wall,

(b) 130 mm for each *storey* of masonry construction supported by the *foundation* wall, and

(c) 150 mm for each *storey* of flat insulating concrete form wall construction supported by the *foundation* wall.

9.15.3.6. Adjustments to Footing Widths for Interior Walls

(1) The minimum strip footing widths for interior *loadbearing* masonry walls shown in Table 9.15.3.4. shall be increased by 100 mm for each *storey* of masonry construction supported by the footing.

(2) Footings for interior non-*loadbearing* masonry walls shall be not less than 200 mm wide for walls up to 5.5 m high and the width shall be increased by 100 mm for each additional 2.7 m of height.

9.15.3.7. Adjustments to Footing Area for Columns

(1) The footing area for column spacings other than shown in Table 9.15.3.4. shall be adjusted in proportion to the distance between columns.

9.15.3.8. Footing Thickness

(1) Footing thickness shall be not less than the greater of,

(a) 100 mm, or

(b) the width of the projection of the footing beyond the supported element.

9.15.3.9. Step Footings

(1) Where step footings are used,

(a) the vertical rise between horizontal portions shall not exceed 600 mm, and

(b) the horizontal distance between risers shall be not less than 600 mm.

9.15.4. Foundation Walls

9.15.4.1. Permanent Form Material

(1) Insulating concrete form units shall be manufactured of polystyrene conforming to the performance requirements of CAN/ULC-S701, "Thermal Insulation, Polystyrene, Boards and Pipe Covering", for Type 2, 3 or 4 polystyrene.

9.15.4.2. Foundation Wall Thickness and Required Lateral Support

(1) Except as required in Sentence (2), the thickness of *foundation* walls made of unreinforced concrete block or solid concrete and subject to lateral earth pressure shall conform to Table 9.15.4.2.A. for walls not exceeding 2.5 m in unsupported height.

Table 9.15.4.2.A.
Thickness of Solid Concrete and Unreinforced Concrete Block Foundation Walls

Forming Part of Sentence 9.15.4.2.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
Type of *Foundation* Wall	Minimum Wall Thickness, Mm	Maximum Height of Finish Ground Above *Basement* Floor or Crawl Space Ground Cover, m	
		Foundation Wall Laterally Unsupported at the Top$^{(1)}$	*Foundation* Wall Laterally Supported at the Top$^{(1)}$
Solid concrete, 15 Mpa min. strength	150	0.8	1.5
	200	1.2	2.15
	250	1.4	2.3
	300	1.5	2.3

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
Type of *Foundation* Wall	Minimum Wall Thickness, Mm	Maximum Height of Finish Ground Above *Basement* Floor or Crawl Space Ground Cover, m	
		Foundation Wall Laterally Unsupported at the Top(1)	*Foundation* Wall Laterally Supported at the Top(1)
Solid concrete, 20 Mpa min. strength	150	0.8	1.8
	200	1.2	2.3
	250	1.4	2.3
	300	1.5	2.3
Unreinforced Concrete Block	140	0.6	0.8
	190	0.9	1.2
	240	1.2	1.8
	290	1.4	2.2

Note to Table 9.15.4.2.A.:

(1) See Article 9.15.4.3.

(2) The thickness of concrete in flat insulating concrete form *foundation* walls shall be not less than the greater of,

(a) 140 mm, or

(b) the thickness of the concrete in the wall above.

(3) *Foundation* walls made of flat insulating concrete form units shall be laterally supported at the top and at the bottom.

(4) Where average stable *soils* are encountered and wind loads on the exposed portion of the *foundation* are no greater than 0.70 kPa, the thickness and reinforcing of *foundation* walls made of reinforced concrete block and subject to lateral earth pressure shall conform to Table 9.15.4.2.B. and Sentences (5) to (10).

Table 9.15.4.2.B.
Reinforced Concrete Block Foundation Walls

Forming Part of Sentence 9.15.4.2.(4)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6
Minimum Wall Thickness, mm	Maximum Height of Finished Ground above *Basement* Floor or Crawl Space Ground Cover, m	*Foundation* Wall Laterally Unsupported at Top (1)		*Foundation* Wall Laterally Supported at Top (1)	
		Continuous Vertical Reinforcement		Continuous Vertical Reinforcement	
		Minimum Bar Size	Maximum Bar Spacing, m	Minimum Bar Size	Maximum Bar Spacing, m
190	1.0	25M	1.2	(2)	(2)
	1.2	25M	1.2	(2)	(2)
	1.4	25M	1.2	15M	1.2
	1.6	25M	0.8	15M	1.2
	1.8	25M	0.6	20M	1.2
	2.0	25M	0.4	20M	1.2
	2.2	(3)	(3)	25M	1.2
	2.4	(3)	(3)	25M	1.2
240	1.4	25M	1.0	(2)	(2)
	1.6	25M	1.0	(2)	(2)
	1.8	25M	0.8	(2)	(2)
	2.0	25M	0.8	20M	1.8
	2.2	25M	0.8	25M	1.8
	2.4	25M	0.6	25M	1.8

Notes to Table 9.15.4.2.B.:

(1) See Article 9.15.4.3.

(2) No reinforcement required.

(3) Design to Part 4.

(5) For concrete block walls required to be reinforced, continuous vertical reinforcement shall,

(a) be provided at wall corners, wall ends, wall intersections, at changes in wall height, at the jambs of all openings and at movement joints,

(b) extend from the top of the footing to the top of the *foundation* wall,

(c) where *foundation* walls are laterally unsupported at the top, have not less than 600 mm embedment into the footing, and

(d) where *foundation* walls are laterally supported at the top, have not less than 50 mm embedment into the footing, if the floor slab does not provide lateral support at the wall base.

(6) Where *foundation* walls are laterally unsupported, the footing shall be designed according to Part 4 to resist overturning and sliding, if the maximum height of finished ground above the *basement* floor or crawl space ground cover exceeds 1.50 m.

(7) At the base of concrete block walls required to be reinforced and where the height of finished ground above the *basement* floor or crawl space ground cover exceeds 2.0 m, not less than one 15M intermediate vertical bar reinforcement shall be installed midway between adjacent continuous vertical reinforcement, and shall,

(a) extend to not less than 600 mm above the top of the footing, and

(b) have not less than 50 mm embedment into the footing, if the floor slab does not provide lateral support at the wall base.

(8) For concrete block walls required to be reinforced, a continuous horizontal bond beam containing at least one 15M bar shall be installed,

(a) along the top of the wall,

(b) at the sill and head of all openings greater than 1.20 m in width, and

(c) at structurally connected floors.

(9) In concrete block walls required to be reinforced, all vertical bar reinforcement shall be installed along the centre line of the wall.

(10) In concrete block walls required to be reinforced, ladder or truss type lateral reinforcement not less than 3.8 mm (No. 9 ASWG) shall be installed in the bed joint of every second masonry course.

9.15.4.3. Foundation Walls Considered to be Laterally Supported at the Top

(1) Sentences (2) to (4) apply to lateral support for walls described in Sentence 9.15.4.2.(1).

(2) *Foundation* walls shall be considered to be laterally supported at the top if,

(a) such walls support solid masonry superstructure,

(b) the floor joists are embedded in the top of the *foundation* walls, or

(c) the floor system is anchored to the top of the *foundation* walls with anchor bolts, in which case the joists may run either parallel or perpendicular to the *foundation* walls.

(3) Unless the wall around an opening is reinforced to withstand earth pressure, the portion of the *foundation* wall beneath an opening shall be considered laterally unsupported, if,

(a) the opening is more than 1.2 m wide, or

(b) the total width of the openings in the *foundation* wall constitutes more than 25% of the length of the wall.

(4) For the purposes of Sentence (3), the combined width of the openings shall be considered as a single opening if the average width is greater than the width of solid wall between them.

(5) Flat insulating concrete form *foundation* walls shall be considered to be laterally supported at the top if the floor joists are installed according to Article 9.20.17.5.

9.15.4.4. Foundation Walls Considered to be Laterally Supported at the Bottom

(1) Flat insulating concrete form *foundation* walls shall be considered to be laterally supported at the bottom where the *foundation* wall,

(a) supports backfill not more than 1.2 m in height,

(b) is supported at the footing by a shear key and is supported at the top by the ground floor framing, or

(c) is dowelled to the footing with not less than 15M bars spaced not more than 1.2 m o.c.

9.15.4.5. Reinforcement for Flat Insulating Concrete Form Foundation Walls

(1) Horizontal reinforcement in flat insulating concrete form *foundation* walls shall,

(a) consist of,

  (i) one 10M bar placed not more than 300 mm from the top of the wall, and

  (ii) 10M bars spaced not more than 600 mm o.c., and

(b) be located,

(i) in the inside half of the wall section, and

(ii) with a minimum cover of 30 mm from the inside face of the concrete.

(2) Vertical wall reinforcement in flat insulating concrete form *foundation* walls shall,

(a) conform to,

(i) Table 9.15.4.5.A. for 140 mm walls,

(ii) Table 9.15.4.5.B. for 190 mm walls, and

(iii) Table 9.15.4.5.C. for 240 mm walls,

(b) be located in the inside half of the wall section with a minimum cover of 30 mm from the inside face of the concrete wall, and

(c) where interrupted by wall openings, be placed not more than 600 mm from each side of the openings.

(3) Cold joints in flat insulating concrete form *foundation* walls shall be reinforced with at least one 15M bar spaced not more than 600 mm o.c. and embedded not less than 300 mm on both sides of the joint.

(4) Reinforcing around openings in flat insulating concrete form *foundation* walls shall comply with Articles 9.20.17.3. or 9.20.17.4.

Table 9.15.4.5.A.
Vertical Reinforcement for 140 mm Flat Insulating Concrete Form Foundation Walls

Forming Part of Sentence 9.15.4.5.(2)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
Maximum Height of Finished Ground Above Finished *Basement* Floor, m	Maximum Vertical Reinforcement		
	Maximum Unsupported *Basement* Wall Height		
	2.44 m	2.75 m	3.00 m
1.35	10M at 400 mm o.c.	10M at 400 mm o.c.	10M at 400 mm o.c.
1.60	10M at 400 mm o.c.	10M at 380 mm o.c.	10M at 380 mm o.c.
2.00	10M at 380 mm o.c.	10M at 380 mm o.c.	10M at 380 mm o.c.
2.20	10M at 250 mm o.c.	10M at 250 mm o.c.	10M at 250 mm o.c.
2.35	n/a	10M at 250 mm o.c.	10M at 250 mm o.c.
2.60	n/a	10M at 250 mm o.c.	10M at 250 mm o.c.
3.00	n/a	n/a	15M at 250 mm o.c.

Table 9.15.4.5.B.
Vertical Reinforcement for 190 mm Flat Insulating Concrete Form Foundation Walls

Forming Part of Sentence 9.15.4.5.(2)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
Maximum Height of Finished Ground Above Finished *Basement* Floor, m	Maximum Vertical Reinforcement		
	Maximum Unsupported *Basement* Wall Height		
	2.44 m	2.75 m	3.00 m
2.20	none required	10M at 400 mm o.c.	10M at 400 mm o.c.
2.35	n/a	10M at 300 mm o.c.	10M at 300 mm o.c.
2.60	n/a	10M at 300 mm o.c.	15M at 400 mm o.c.
3.00	n/a	n/a	15M at 400 mm o.c.

Table 9.15.4.5.C.
Vertical Reinforcement for 240 mm Flat Insulating Concrete Form Foundation Walls

Forming Part of Sentence 9.15.4.5.(2)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
Maximum Height of Finished Ground Above Finished *Basement* Floor, m	Maximum Vertical Reinforcement		
	Maximum Unsupported *Basement* Wall Height		
	2.44 m	2.75 m	3.00 m
2.20	none required	none required	none required
2.60	n/a	15M at 400 mm o.c.	15M at 400 mm o.c.
3.00	n/a	n/a	15M at 400 mm o.c.

9.15.4.6. Extension above Ground Level

(1) Exterior *foundation* walls shall extend not less than 150 mm above finished ground level.

9.15.4.7. Reduction in Thickness

(1) Where the top of a *foundation* wall is reduced in thickness to permit the installation of floor joists, the reduced section shall be not more than 350 mm high and not less than 90 mm thick.

(2) Where the top of a *foundation* wall is reduced in thickness to permit the installation of a masonry exterior facing, the reduced section shall be,

(a) not less than 90 mm thick, and

(b) tied to the facing material with metal ties conforming to Sentence 9.20.9.4.(3) spaced not more than,

  (i) 200 mm o.c. vertically, and

  (ii) 900 mm o.c. horizontally.

(3) The space between wall and facing described in Sentence (2) shall be filled with mortar.

9.15.4.8. Corbelling

(1) Corbelling of masonry *foundation* walls supporting *cavity walls* shall conform to Article 9.20.12.2.

9.15.4.9. Crack Control Joints

(1) Crack control joints shall be provided in *foundation* walls more than 25 m long at intervals of not more than 15 m.

(2) Joints required in Sentence (1) shall be designed to resist moisture penetration and shall be keyed to prevent relative displacement of the wall portions adjacent to the joint.

9.15.4.10. Interior Masonry Walls

(1) Interior masonry *foundation* walls not subject to lateral earth pressure shall conform to Section 9.20.

9.15.5. Support of Joists and Beams on Masonry Foundation Walls

9.15.5.1. Support of Floor Joists

(1) Except as permitted in Sentence (2), *foundation* walls of hollow unit masonry supporting floor joists shall be,

(a) capped with not less than 50 mm of solid masonry or concrete, or

(b) have the top course filled with mortar or concrete.

(2) Capping required in Sentence (1) is permitted to be omitted,

(a) in localities where termites are not known to occur,

(b) when the joists are supported on a wood plate not less than 38 mm by 89 mm, and

(c) when the siding overlaps the *foundation* wall not less than 12 mm.

9.15.5.2. Support of Beams

(1) Not less than a 190 mm depth of solid masonry shall be provided beneath beams supported on masonry.

(2) Where the beam referred to in Sentence (1) is supported below the top of the *foundation* walls, the ends of such beams shall be protected from the weather.

9.15.5.3. Pilasters

(1) Pilasters shall be provided under beams that frame into unit masonry *foundation* walls 140 mm or less in thickness.

(2) Pilasters required in Sentence (1) shall be not less than 90 mm by 290 mm and shall be bonded or tied into the wall.

(3) The top 200 mm of pilasters required in Sentence (1) shall be solid.

9.15.6. Parging and Finishing of Foundation Walls

9.15.6.1. Foundation Walls Below Ground

(1) Concrete block *foundation* walls shall be parged on the exterior face below ground level as required in Section 9.13.

9.15.6.2. Foundation Walls Above Ground

(1) Exterior surfaces of concrete block *foundation* walls above ground level shall have tooled joints, or shall be rendered, parged or otherwise suitably finished.

9.15.6.3. Form Ties

(1) All form ties shall be removed at least flush with the concrete surface.

Section 9.16. Floors-on-Ground

9.16.1. Scope

9.16.1.1. Application

(1) This Section applies to floors that are supported on ground or granular *fill* and that do not provide structural support for the superstructure.

9.16.1.2. Structural Floor Slabs

(1) Floors-on-ground that support loads from the superstructure shall be designed in conformance with Part 4.

9.16.1.3. Required Floors-on-Ground

(1) All spaces within *dwelling* units, except crawl spaces, shall be provided with a floor-on-ground, where,

(a) access is provided to the space, and

(b) a floor supported by the structure is not provided.

9.16.1.4. Dampproofing and Waterproofing

(1) Dampproofing and waterproofing shall conform to Section 9.13.

9.16.2. Material Beneath Floors

9.16.2.1. Required Installation of Granular Fill

(1) Except as provided in Sentence (2), not less than 100 mm of coarse clean granular material containing not more than 10% of material that will pass a 4 mm sieve shall be placed beneath floors-on-ground.

(2) Granular material need not be installed under,

(a) slabs in garages, carports or accessory *buildings*, or

(b) *buildings* of *industrial occupancy* where the nature of the process contained in the *occupancy* permits or requires the use of large openings in the *building* envelope even during the winter.

9.16.2.2. Support of Floors

(1) Material that is susceptible to changes in volume due to variations in moisture content or chemical-microbiological oxidation shall not be used as *fill* beneath floors-on-ground in a concentration that will damage the *building* to a degree that would adversely affect its stability or the performance of assemblies separating dissimilar environments.

(2) Material that is susceptible to changes in volume due to freezing shall not be used as *fill* beneath floors-on-ground that will be subjected to freezing temperatures.

(3) Except as provided in Sentence (4), *fill* beneath floors-on-ground shall be compacted.

(4) *Fill* beneath floors-on-ground need not be compacted where the material is clean coarse aggregate containing not more than 10% of material that will pass a 4 mm sieve.

9.16.3. Drainage

9.16.3.1. Control of Water Ingress

(1) Except as provided in Article 9.16.3.2. or where it can be shown to be unnecessary, ingress of water underneath a floor-on-ground shall be prevented by grading or drainage.

9.16.3.2. Hydrostatic Pressure

(1) Where *groundwater* levels may cause hydrostatic pressure beneath a floor-on-ground, the floor-on-ground shall be,

(a) a cast-in-place concrete slab, and

(b) designed to resist such pressures.

9.16.3.3. Floor Drains

(1) When floor drains are required, the floor surface shall be sloped so that no water can accumulate.

9.16.4. Concrete

9.16.4.1. Surface Finish

(1) The finished surface of concrete floor slabs shall be trowelled smooth and even.

(2) Dry cement shall not be added to the floor surfaces to absorb surplus water.

9.16.4.2. Topping Course

(1) Where a topping course is provided for a concrete floor slab, it shall consist of 1 part cement to 2.5 parts clean, well graded sand by volume, with a water/cement ratio approximately equal to that of the base slab.

(2) When concrete topping is provided it shall not be less than 20 mm thick.

9.16.4.3. Thickness

(1) Concrete slabs shall be not less than 75 mm thick exclusive of concrete topping.

9.16.4.4. Bond Break

(1) A bond-breaking material shall be placed between the slab and footings or *rock*.

9.16.4.5. Compressive Strength

(1) Where dampproofing is not provided the concrete used for floors-on-ground shall have a compressive strength of not less than 25 MPa after 28 days.

(2) Where dampproofing is provided as described in Article 9.13.2.7., the concrete used for floors-on-ground shall have a compressive strength of not less than 15 MPa after 28 days.

9.16.5. Wood

9.16.5.1. Wood Frame Floors

(1) Floors-on-ground constructed of wood shall conform to CAN/CSA-S406, "Construction of Preserved Wood Foundations".

Section 9.17. Columns

9.17.1. Scope

9.17.1.1. Application

(1) This Section applies to columns used to support,

(a) beams carrying loads from not more than 2 wood frame floors where,

  (i) the supported length of joists bearing on such beams does not exceed 5 m, and

  (ii) the *live load* on any floor does not exceed 2.4 kPa, or

(b) beams or header joists carrying loads from not more than 2 levels of wood frame balconies, decks or other accessible exterior platforms, or 1 level and the roof, where,

  (i) the supported length of joists bearing on such beams or joists does not exceed 5 m,

  (ii) the sum of the specified snow load and the load due to use and *occupancy* does not exceed 4.8 kPa,

  (iii) the platform serves only a single *suite* of *residential occupancy*, and

  (iv) the platform does not serve as a required *exit*, or

(c) carport roofs.

(2) Columns for applications other than as described in Sentence (1) shall be designed in accordance with Part 4.

9.17.2. General

9.17.2.1. Location

(1) Columns shall be centrally located on a footing conforming to Section 9.15.

9.17.2.2. Lateral Support

(1) Columns shall be securely fastened to the supported member to reduce the likelihood of lateral differential movement between the column and the supported member.

(2) Except as permitted by Sentence (3), columns shall be laterally supported,

(a) directly, or

(b) by connection to the supported members.

(3) Columns need not be provided with lateral support as described in Sentence (2) where,

(a) the length of the columns are not more than 600 mm measured from the finished ground to the underside of the supported member, and

(b) the columns support a deck with no superstructure.

9.17.3. Steel Columns

9.17.3.1. Size and Thickness

(1) Except as permitted in Sentence (2), steel pipe columns shall have an outside diameter of not less than 73 mm and a wall thickness of not less than 4.76 mm.

(2) Columns of sizes other than as specified in Sentence (1) are permitted to be used where the *loadbearing* capacities are shown to be adequate.

9.17.3.2. End Bearing Plates

(1) Except as permitted in Sentence (2), steel columns shall be fitted with not less than 100 mm by 100 mm by 6.35 mm thick steel plates at each end, and where the column supports a wooden beam, the top plate shall extend across the full width of the beam.

(2) The top plate required in Sentence (1) need not be provided where a column supports a steel beam and provision is made for the attachment of the column to the beam.

9.17.3.3. Paint

(1) Exterior steel columns susceptible to corrosion shall be treated on the outside surface with at least one coat of rust-inhibitive paint.

9.17.3.4. Design of Adjustable Steel Columns

(1) Where the imposed load does not exceed 36 kN, adjustable steel columns shall conform to CAN/CGSB-7.2, "Adjustable Steel Columns".

(2) Adjustable steel columns other than those described in Sentence (1) shall be designed in accordance with Part 4.

9.17.4. Wood Columns

9.17.4.1. Column Sizes

(1) The width or diameter of a wood column shall be not less than the width of the supported member.

(2) Except as provided in Article 9.35.4.2., columns shall be not less than 184 mm for round columns and 140 mm by 140 mm for rectangular columns, unless calculations are provided to show that lesser sizes are adequate.

9.17.4.2. Materials

(1) Wood columns shall be either solid, glue-laminated or built-up.

(2) Built-up columns shall consist of not less than 38 mm thick full-length members,

(a) bolted together with not less than 9.52 mm diam bolts spaced not more than 450 mm o.c., or

(b) nailed together with not less than 76 mm nails spaced not more than 300 mm o.c.

(3) Glued-laminated columns shall conform to Section 4.3.

9.17.4.3. Columns in Contact with Concrete

(1) Wood columns shall be separated from concrete in contact with the ground by 0.05 mm polyethylene film or Type S roll roofing.

9.17.4.4. Wood Column Termite Protection

(1) Where termites are known to exist, exterior wood columns such as porch supports shall be,

(a) pressure-treated with a chemical that is toxic to such termites, in accordance with Article 9.3.2.9., or

(b) supported on non-cellulosic material extending not less than 150 mm above grade and located not less than 50 mm from the exterior wall of an adjacent *building*.

9.17.5. Unit Masonry Columns

9.17.5.1. Materials

(1) Unit masonry columns shall be built of masonry units,

(a) conforming to CSA A165.1, "Concrete Block Masonry Units", and

(b) have a compressive strength over the net area of the block of not less than 15 MPa.

9.17.5.2. Sizes

(1) Unit masonry columns shall be not less than 290 mm by 290 mm or 240 mm by 380 mm in size.

9.17.6. Solid Concrete Columns

9.17.6.1. Materials

(1) Concrete shall conform to Section 9.3.

9.17.6.2. Sizes

(1) Concrete columns shall be not less than 200 mm by 200 mm for rectangular columns and 230 mm diam for circular columns.

Section 9.18. Crawl Spaces

9.18.1. General

9.18.1.1. Application

(1) In this Section, a crawl space refers to an enclosed space between the underside of a floor assembly and the ground cover directly below, with a clearance less than 1 800 mm in height.

9.18.1.2. Foundations

(1) *Foundations* enclosing crawl spaces shall conform to Section 9.15.

9.18.1.3. Heated and Unheated Crawl Spaces

(1) Crawl spaces shall be considered to be heated where the space,

(a) is used as a hot air *plenum*,

(b) contains heating ducts or heating pipes that are not sealed and insulated to minimize heat loss to the space, or

(c) is not separated from heated space in accordance with Section 9.25.

(2) Heating of heated crawl spaces shall conform to Section 9.33.

(3) Insulation, an *air barrier system* and a *vapour barrier* shall be installed in the walls of heated crawl spaces in accordance with Section 9.25.

9.18.2. Access

9.18.2.1. Access Openings

(1) An access opening of not less than 500 mm by 700 mm shall be provided to each crawl space where the crawl space serves a single *dwelling unit*, and not less than 550 mm by 900 mm for other crawl spaces.

(2) Access openings shall be fitted with a door or hatch, except when the crawl space is heated and the access opening into the crawl space is from the adjacent heated space.

9.18.3. Ventilation

9.18.3.1. Ventilation of Unheated Crawl Spaces

(1) Unheated crawl spaces shall be ventilated by natural or mechanical means.

(2) Where an unheated crawl space is ventilated by natural means, ventilation shall be provided to the outside air by not less than 0.1 m^2 of unobstructed vent area for every 50 m^2 of *floor area*.

(3) Vents shall be,

(a) uniformly distributed on opposite sides of the *building*, and

(b) designed to prevent the entry of snow, rain and insects.

9.18.3.2. Ventilation of Heated Crawl Spaces

(1) Heated crawl spaces shall be ventilated in accordance with Section 9.32.

9.18.4. Clearance

9.18.4.1. Access Way to Services

(1) Where equipment requiring service such as plumbing cleanouts, traps and burners is located in crawl spaces, an access way with a height and width of not less than 600 mm shall be provided from the access door to the equipment and for a distance of 900 mm on the side or sides of the equipment to be serviced.

9.18.5. Drainage

9.18.5.1. Drainage

(1) Except where it can be shown to be unnecessary, the ingress of water into a crawl space shall be controlled by grading or drainage.

(2) Drainage of *foundation* walls shall conform to Article 9.14.2.1.

(3) Drainage of the ground cover or floor-on-ground in the crawl space shall conform to Subsection 9.16.3.

(4) Drains shall conform to Section 9.14.

9.18.6. Ground Cover

9.18.6.1. Ground Cover in Unheated Crawl Spaces

(1) Where a crawl space is unheated, a ground cover shall be provided consisting of not less than,

(a) 50 mm of asphalt paving material,

(b) 100 mm of 15 MPa Portland cement concrete,

(c) Type S roll roofing, or

(d) 0.10 mm polyethylene.

(2) Joints in sheet-type ground cover required in Sentence (1) shall be lapped not less than 100 mm and weighted down.

9.18.6.2. Ground Cover in Heated Crawl Spaces

(1) Where a crawl space is heated, a ground cover consisting of not less than 0.15 mm polyethylene sheet conforming to CAN/CGSB-51.34-M, "Vapour Barrier, Polyethylene Sheet, for Use in Building Construction", shall be provided.

(2) The ground cover required in Sentence (1) shall,

(a) have its joints lapped not less than 300 mm, and sealed and weighted down, or

(b) be covered with a concrete skim coat not less than 50 mm thick.

(3) The perimeter of the ground cover required in Sentence (1) shall be sealed to the *foundation* wall.

9.18.7. Fire Protection

9.18.7.1. Crawl Spaces as Warm Air Plenums

(1) Only crawl spaces under 1-*storey* portions of *dwelling units* shall be used as warm-air *plenums*.

(2) Enclosing material in crawl spaces described in Sentence (1) including insulation shall have a surface *flame-spread rating* not greater than 150.

(3) *Combustible* ground cover used as enclosing material in Sentence (2) shall be covered with *noncombustible* material.

Section 9.19. Roof Spaces

9.19.1. Venting

9.19.1.1. Required Venting

(1) Except where it can be shown to be unnecessary, where insulation is installed between a ceiling and the underside of the roof sheathing, a space shall be provided between the insulation and the sheathing, and vents shall be installed to permit the movement of air from the space to the exterior.

9.19.1.2. Vent Requirements

(1) Except as provided in Sentence (2), the unobstructed vent area shall be not less than 1/300 of the insulated ceiling area.

(2) Where the roof slope is less than 1 in 6 or in roofs that are constructed with roof joists, the unobstructed vent area shall be not less than 1/150 of the insulated ceiling area.

(3) Required vents are permitted to be roof type, eave type, gable-end type or any combination of them, and shall be distributed,

(a) uniformly on opposite sides of the *building*,

(b) with not less than 25% of the required openings located at the top of the space, and

(c) with not less than 25% of the required openings located at the bottom of the space.

(4) Except where each roof joist space referred to in Sentence (2) is separately vented, roof joist spaces shall be interconnected by installing purlins not less than 38 mm by 38 mm on the top of the roof joists.

(5) Vents shall comply with CAN3-A93-M, "Natural Airflow Ventilators for Buildings".

9.19.1.3. Clearances

(1) Except as provided in Sentence (2), where venting is provided to a roof joist space, not less than 63 mm of space shall be provided between the top of the insulation and the underside of the roof sheathing.

(2) Where venting is provided at the junction of sloped roofs and exterior walls and where preformed baffles are used to contain the insulation, the baffles shall,

(a) provide an unobstructed air space between the insulation and the underside of the roof sheathing, that is,

(i) not less than 25 mm in dimension, and

(ii) of sufficient cross area to meet the *attic or roof space* venting requirements of Article 9.19.1.2., and

(b) extend vertically not less than 50 mm vertically above the top of the insulation.

(3) Ceiling insulation shall be installed in a manner that will not restrict a free flow of air through roof vents or through any portion of the *attic or roof space*.

9.19.1.4. Mansard or Gambrel Roof

(1) The lower portion of a mansard or gambrel style roof need not be ventilated.

(2) The upper portion of roofs described in Sentence (1) shall be ventilated in conformance with the requirements in Articles 9.19.1.1. to 9.19.1.3.

9.19.2. Access

9.19.2.1. Access

(1) Every *attic or roof space* shall be provided with an access hatch where the *attic or roof space* measures not less than,

(a) 10 m^2 in area,

(b) 1 000 mm in length or width, and

(c) 600 mm in height over at least the area described in Clauses (a) and (b).

(2) The hatch required in Sentence (1) shall be not less than 550 mm by 900 mm except that, where the hatch serves a single *dwelling unit*, the hatch the hatch may be reduced to 0.32 m^2 in area with no dimension less than 545 mm.

(3) Hatchways to *attic or roof spaces* shall be fitted with doors or covers.

Section 9.20. Masonry and Insulating Concrete Form Walls Not in Contact with the Ground

9.20.1. Application

9.20.1.1. General

(1) Except as provided in Article 9.20.1.2., this Section applies to,

(a) unreinforced masonry and masonry veneer walls not in contact with the ground, where,

(i) the height of the walls constructed on the *foundation* walls does not exceed 11 m, and

(ii) the roof or floor assembly above the *first storey* is not of concrete construction, and

(b) flat insulating concrete form walls not in contact with the ground that,

(i) have a maximum floor to floor height of 3 m,

(ii) are erected in *buildings* not more than 2 *storeys* in *building height* and containing only a single *dwelling unit*, and

(iii) are erected in locations where the seismic spectral response acceleration, $S_a(0.2)$ is not greater than 0.4.

(2) For walls other than those described in Sentence (1), or where the masonry walls or insulating concrete form walls not in contact with the ground are designed for specified loads on the basis of ultimate and serviceability limit states, Subsection 4.3.2. shall apply.

9.20.1.2. Earthquake Reinforcement

(1) In locations where the seismic spectral response acceleration, $S_a(2.0)$, is greater than 0.55, *loadbearing* elements of masonry *buildings* more than 1 *storey* in *building height* shall be reinforced with not less than the minimum amount of reinforcement as required in Subsection 9.20.15.

(2) In locations where the seismic spectral response acceleration, $S_a(2.0)$, is greater than 0.35, but less than or equal to 0.55, *loadbearing* elements of masonry *buildings* 3 *storeys* in *building height* shall be reinforced with not less than the minimum amount of reinforcement as required in Subsection 9.20.15.

9.20.2. Masonry Units

9.20.2.1. Masonry Unit Standards

(1) Masonry units shall comply with,

(a) ASTM C126, "Ceramic Glazed Structural Clay Facing Tile, Facing Brick, and Solid Masonry Units",

(b) ASTM C212, "Structural Clay Facing Tile",

(c) CAN/CSA-A82.1-M, "Burned Clay Brick (Solid Masonry Units Made from Clay or Shale)",

(d) CSA A82.3-M, "Calcium Silicate (Sand-Lime) Building Brick",

(e) CSA A82.4-M, "Structural Clay Load-Bearing Wall Tile",

(f) CSA A82.5-M, "Structural Clay Non-Load-Bearing Tile",

(g) CAN3-A82.8-M, "Hollow Clay Brick",

(h) CSA A165.1, "Concrete Block Masonry Units",

(i) CSA A165.2, "Concrete Brick Masonry Units",

(j) CSA A165.3, "Prefaced Concrete Masonry Units", or

(k) CAN3-A165.4-M, "Autoclaved Cellular Units".

9.20.2.2. Used Brick

(1) Used bricks shall be free of old mortar, soot or other surface coating and shall conform to Article 9.20.2.1.

9.20.2.3. Glass Blocks

(1) Glass blocks shall not be used as *loadbearing* units or in the construction of fireplaces or *chimneys*.

9.20.2.4. Cellular Concrete

(1) Masonry made with cellular concrete shall not be used in contact with the *soil* or exposed to the weather.

9.20.2.5. Stone

(1) Stone shall be sound and durable.

9.20.2.6. Concrete Units Exposed to the Weather

(1) Concrete blocks exposed to the weather shall have weight and water absorption characteristics conforming to Classes A, B, C or D, described in CSA A165.1, "Concrete Block Masonry Units".

9.20.2.7. Compressive Strength

(1) The compressive strength of concrete blocks shall conform to Table 9.20.2.7.

Table 9.20.2.7.
Compressive Strength of Concrete Blocks

Forming Part of Sentence 9.20.2.7.(1)

COLUMN 1	COLUMN 2	COLUMN 3
Type of Block	Minimum Compressive Strength Over Net Area, MPa	
	Exposed to Weather	Not Exposed to Weather
Solid or hollow concrete blocks	15	10
Solid *loadbearing* cellular blocks	Not permitted	5
Solid non-*loadbearing* cellular blocks	Not permitted	2

9.20.3. Mortar

9.20.3.1. Mortar Materials

(1) Cementitious materials and aggregates for mortar and grout shall comply with CSA A179, "Mortar and Grout for Unit Masonry".

(2) Water and aggregate shall be clean and free of significant amounts of deleterious materials.

(3) Lime used in mortar shall be hydrated.

(4) If lime putty is used in mortar, it shall be made by slaking quicklime in water for not less than 24 h or soaking hydrated lime in water for not less than 12 h.

9.20.3.2. Mortar and Grout Mixes

(1) Mortar types shall conform to Table 9.20.3.2.A.

(2) Mortar for glass block masonry shall be,

(a) Type S Portland cement-lime where exposed to the exterior, or

(b) Type S or N where protected from the exterior.

(3) Mortar mix proportions shall conform to Table 9.20.3.2.B., with sufficient water to bring the mixture to a consistency adequate for laying masonry units.

(4) Grout mix proportions shall conform to Table 9.20.3.2.C., with sufficient water to provide a suitable flow to fill all voids completely, without excessive segregation or bleeding.

(5) Except as provided in Sentence (6), mortar shall be used and placed in final position,

(a) within 1.5 h after mixing when the air temperature is 25°C or higher, and

(b) within 2.5 h after mixing when the air temperature is less than 25°C.

(6) Mortar and grout containing a set-control admixture shall be manufactured off-site in a batching plant and shall be used and placed in final position within a time not exceeding the useful life as stipulated by the manufacturer.

(7) Grout used for reinforced masonry shall be placed in accordance with the requirements of CSA A371, "Masonry Construction for Buildings".

Table 9.20.3.2.A.
Mortar Use

Forming Part of Sentence 9.20.3.2.(1)

COLUMN 1	COLUMN 2	COLUMN 3
Location	*Building* Element	Mortar Type
Exterior, above ground	*Loadbearing* walls and columns	S
	Non-*loadbearing* walls and columns	N or S
	Parapets, *chimneys* and masonry veneer	N or S
Exterior, at or below ground	*Foundation* walls and *chimneys*	S
Interior	*Loadbearing* walls and columns	N
	Non-*loadbearing* walls and columns	N

Table 9.20.3.2.B.
Mortar Mix Proportions (by Volume)

Forming Part of Sentence 9.20.3.2.(3)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6
Mortar Type	Portland Cement	Lime	Masonry Cement Type N	Masonry Cement Type S	Fine Aggregate (damp, loose-state sand)
S	1	½	-	-	3½ - 4½
	-	-	-	1	2¼ - 3
	½	-	1	-	3½ - 4½
N	1	1	-	-	4½ - 6
	-	-	1	-	2¼ - 3

Table 9.20.3.2.C.
Grout Mix Proportions (by Volume)

Forming Part of Sentence 9.20.3.2.(4)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
Portland Cement	Lime	Fine Aggregate (sand)	Coarse Aggregate
1	0 to 1/10	2¼ to 3 times the sum of the cement and lime volumes	1 to 2 times the sum of the cement and lime volumes

9.20.4. Mortar Joints

9.20.4.1. Thickness

(1) Except as provided in Sentence (2), mortar joint thickness for burned clay brick and concrete masonry units shall be 10 mm.

(2) Permitted tolerances in head and bed joints shall be -5 mm to +10 mm.

9.20.4.2. Solid Masonry Units

(1) Except for head joints left open for weep holes and ventilation, solid masonry units shall be laid with full head and bed joints.

9.20.4.3. Hollow Masonry Units

(1) Hollow masonry units shall be laid with mortar applied to head and bed joints of both inner and outer face shells.

(2) Vertically aligned webs of hollow masonry units shall be laid in a full bed of mortar,

(a) under the starting course,

(b) in all courses of columns, and

(c) where adjacent to cells or cavities that are to be filled with grout.

9.20.5. Masonry Support

9.20.5.1. Masonry Support

(1) All masonry shall be supported on masonry, concrete or steel, except that masonry veneer walls are permitted to be supported on *foundations* of wood frame constructed in conformance with Sentence 9.15.2.4.(1).

(2) Every masonry wall shall be at least as thick as the wall it supports, except as otherwise permitted in Article 9.20.12.2.

9.20.5.2. Lintels or Arches

(1) Masonry over openings shall be supported by steel, reinforced concrete lintels or masonry arches designed to support the imposed loads.

(2) Except as permitted in Sentences (3) and (6), steel angle lintels supporting masonry above openings shall conform to Table 9.20.5.2.A.

(3) Steel angle lintels supporting masonry veneer above openings shall conform to Table 9.20.5.2.B.

(4) Steel lintels described in Sentences (2) and (3) shall,

(a) have even and level bearing and shall have not less than 150 mm length of bearing at end supports, and

(b) bear on masonry, concrete or steel.

(5) Steel angle lintels supporting masonry shall be primed or painted or otherwise protected from corrosion.

(6) Steel beams supporting masonry veneer and wood stud walls above openings shall conform to Table 9.20.5.2.C.

(7) Steel beams described in Sentence (6) shall be supported at each end by a steel column, and have a minimum 6 mm plate welded to the flange to support the masonry veneer.

Table 9.20.5.2.A.
Loose Steel Lintels for Masonry – No. & Size of Angles Required(7)

Forming Part of Sentence 9.20.5.2.(2)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COL. 5	COL. 6	COL. 7	COL. 8	COL. 9	COL. 10	COL. 11
Clear Span(1)(3)	Exterior Angles		Wall Thickness, mm	Interior Angles						
	for Brick	for Stone		Maximum Floor Loads per Metre of Span in Newtons(2)(4)(5)						
	100 mm	100 mm + 50 mm stone facing		None	3 650	7 300	10 950	14 600	18 250	21 900
	No Floor Load									
1 200 mm or less	L-90 × 90 × 6	L-125 × 90 × 8	203	L-90 x 90 x6	L-90 x 90 x6	L-90 x 90 x8	L-100 x 90 x8	L-125 x 90 x8	L-125 x 90 x10	L-125 x 90 x13
			305	2Ls-90 x 90 x 8	2Ls-90 x 90 x 8	2Ls-90 x 90 x 8	2Ls-90 x 90 x 8	2Ls-90 x 90 x 8	2Ls-100 x 90 x 8	2Ls-100 x 90 x 8
1 500 mm	L-90 × 90 × 8	L-125 × 90 × 8	203	L-90 x 90 x8	L-90 x 90 x8	L-125 x 90 x8	L-125 x 90 x10	L-125 x 90 x13	L-150 x 90 x10	— — —
			305	2Ls-90 x 90 x 8	2Ls-90 x 90 x 8	2Ls-90 x 90 x 8	2Ls-125 x 90 x 8	2Ls-125 x 90 x 8	2Ls-125 x 90 x 8	2Ls-125 x 90 x 10
1 800 mm	L-100 × 90 × 8	L-125 × 125 × 8	203	L-100 x 90 x 8	L-125 x 90 x 8	L-125 x 90 x 8	L-150 x 100 x 10			
			305	2Ls-100 x 90 x 8	2Ls-100 x 90 x 8	2Ls-125 x 90 x 8	2Ls-125 x 90 x 8	2Ls-125 x 90 x 10	2Ls-150 x 100 x 10	2Ls-150 x 100 x 10

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COL. 5	COL. 6	COL. 7	COL. 8	COL. 9	COL. 10	COL. 11
Clear Span(1)(3)	Exterior Angles		Wall Thickness ,mm	Interior Angles						
	for Brick	for Stone		Maximum Floor Loads per Metre of Span in Newtons(2)(4)(5)						
	100 mm	100 mm + 50 mm stone facing		None	3 650	7 300	10 950	14 600	18 250	21 900
	No Floor Load									
2 100 mm	L-100 × 90 × 8	L-125 × 125 × 8	203	L-100 x 90 x 8	L-125 x 90 x 10	L-150 x 100 x 10				
			305	2Ls-100 x 90 x 8	2Ls-125 x 90 x 10	2Ls-125 x 90 x 10	2Ls-150 x 100 x 10	2Ls-150 x 100 x 10		
2 400 mm	L-125 × 90 × 8	L-125 × 125 × 8	203	L-125 x 90 x 8	L-150 x 100 x 10					
			305	2Ls-125 x 90 x 8	2Ls-125 x 90 x 13	2Ls-150 x 100 x 10				
2 700 mm	L-125 × 90 × 10	L-125 × 125 × 10	203	L-125 x 90 x 10						
			305	2Ls-125 x 150 x 10	2Ls-150 x 100 x 10					
3 000 mm	L-150 × 100 × 10	L-125 × 125 × 13	203	L-150 x 100 x 10						
			305	2Ls-150 x 100 x 10						

Notes to Table 9.20.5.2.A.:

(1) See Sentence 9.20.5.2.(4).

(2) Omit floor load in lintel when distance to bottom of floor construction is greater than width of opening.

(3) Interior and exterior angles in 200 mm walls and interior angles in 300 mm walls are bolted together when clear span is over 1 800 mm.

(4) When masonry lighter than brick is used over interior angles floor load may be increased by the difference in weight per square metre times the width of the opening. Not generally available.

(5) Interior angles have been designed for floor load plus brick masonry of height equal to width of opening.

(6) fs = 138 Mpa., Deflection maximum = 1/700 span.

(7) The figures in the Table indicating wall thickness and angle cross-section are in mm.

Table 9.20.5.2.B.
Maximum Allowable Spans for Steel Lintels Supporting Masonry Veneer, m

Forming Part of Sentence 9.20.5.2.(3)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6
Minimum Angle Size, mm			70 mm Brick	90 mm Brick	100 mm Stone
Vertical Leg	Horizontal Leg	Thickness			
90	75	6	2.55	—	—
90	90	6	2.59	2.47	2.30
100	90	6	2.79	2.66	2.48
125	90	8	3.47	3.31	3.08
125	90	10	3.64	3.48	3.24
125	90	13	3.82	3.59	3.33

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6
Minimum Angle Size, mm			70 mm	90 mm	100 mm
Vertical Leg	Horizontal Leg	Thickness	Brick	Brick	Stone
150	90	10	4.06	3.82	3.54
150	90	13	4.32	4.07	3.77
150	100	13	4.37	4.12	3.82
180	100	10	4.57	4.30	3.99
180	100	13	4.87	4.59	4.25

Table 9.20.5.2.C.
Maximum Allowable Spans for Steel Beams Supporting Masonry Veneer, m(1), (2)

Forming Part of Sentence 9.20.5.2.(6)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
Section	70 mm Brick	90 mm Brick	100 mm Stone
W 150 × 22	4.23	4.09	3.92
W 150 × 30	4.68	4.52	4.32
W 200 × 27	5.26	5.08	4.84
W 200 × 31	5.57	5.37	5.11
W 200 × 36	5.70	5.49	5.23

Notes toTable 9.20.5.2.C.:

(1) These spans assume that the beam supports the veneer, a wood stud wall and a maximum specified roof live load of 2.3 kN/m.

(2) Where the steel beam carries floor loads or larger roof loads, refer to Article 9.23.4.3.

9.20.6. Thickness and Height

9.20.6.1. Thickness of Exterior Walls

(1) Masonry exterior walls, other than *cavity walls*, in 1 *storey buildings* and the top *storeys* of 2- and 3-*storey buildings* shall be not less than 140 mm thick provided the walls are not more than 2.8 m high at the eaves and 4.6 m high at the peaks of gable ends.

(2) The exterior walls of the bottom *storeys* of 2 *storey buildings*, and exterior walls of the bottom 2 *storeys* of 3 *storey buildings* shall be not less than 190 mm thick.

(3) In exterior walls composed of more than one wythe, each wythe shall be not less than 90 mm thick.

9.20.6.2. Cavity Walls

(1) *Cavity walls* shall be made with not less than 90 mm wide units if the joints are raked and not less than 75 mm wide units if the joints are not raked.

(2) The width of a cavity in a *cavity wall* shall be not less than 50 mm nor greater than 150 mm.

(3) The minimum thickness of *cavity walls* above the supporting base shall be 230 mm for the top 7.6 m and 330 mm for the remaining portion, except that where 75 mm wide units are used, the wall height above the top of the *foundation* wall shall not exceed 6 m.

9.20.6.3. Thickness of Interior Walls

(1) The thickness of *loadbearing* interior walls shall be determined on the basis of the maximum lateral support spacing as provided in Sentences 9.20.10.1.(2) and (3).

(2) The thickness of interior non-*loadbearing* walls shall be,

(a) determined on the basis of the maximum lateral support spacing as provided in Sentences 9.20.10.1.(2) and (3), and

(b) in any case, not less than 65 mm.

9.20.6.4. Masonry Veneer

(1) Except for masonry veneer where each masonry unit is supported individually by the structural backing, masonry veneer shall be of solid units not less than 70 mm thick.

(2) Veneer described in Sentence (1) over wood frame walls shall have not less than a 25 mm air space behind the veneer.

(3) Masonry veneer less than 90 mm thick shall have unraked joints.

(4) Masonry veneer shall conform to Subsection 4.3.2. where the masonry units are required to be individually supported by the structural backing.

9.20.6.5. Parapet Walls

(1) The height of parapet walls above the adjacent roof surface shall be not more than 3 times the parapet wall thickness.

(2) Parapet walls shall be solid from the top of the parapet to not less than 300 mm below the adjacent roof level.

9.20.6.6. Stone or Concrete Facings

(1) Slab and panel facings of precast concrete and natural or artificial stone shall conform to Subsection 4.3.2.

9.20.7. Chases and Recesses

9.20.7.1. Maximum Dimensions

(1) Except as permitted in Sentence 9.20.7.2.(2) and Article 9.20.7.4., the depth of any chase or recess shall not exceed one third the thickness of the wall, and the width of the chase or recess shall not exceed 500 mm.

9.20.7.2. Minimum Wall Thickness

(1) Except as permitted in Sentence (2) and Article 9.20.7.4., no chase or recess shall be constructed in any wall 190 mm or less in thickness.

(2) Recesses may be constructed in 190 mm walls provided they do not exceed 100 mm in depth, 750 mm in height and 500 mm in width.

9.20.7.3. Separation of Chases and Recesses

(1) Chases and recesses shall be not less than,

(a) 4 times the wall thickness apart measured from centre to centre, and

(b) 600 mm away from any pilaster, cross wall, buttress or other vertical element providing required lateral support for the wall.

9.20.7.4. Non-Conforming Chases or Recesses

(1) Chases or recesses that do not conform to the limits specified in Articles 9.20.7.1. to 9.20.7.3. shall be considered as openings, and any masonry supported above such a chase or recess shall be supported by a lintel or arch as provided in Article 9.20.5.2.

9.20.7.5. Chases or Recesses Cut into Walls

(1) Chases or recesses shall not be cut into walls made with hollow units after the masonry units are in place.

9.20.8. Support of Loads

9.20.8.1. Capping of Hollow Masonry Walls

(1) Except as permitted in Sentence (2), *loadbearing* walls of hollow masonry units supporting roof or floor framing members shall be capped with not less than 50 mm of solid masonry or have the top course filled with concrete.

(2) Capping required in Sentence (1) may be omitted where the roof framing is supported on a wood plate not less than 38 mm by 89 mm.

9.20.8.2. Cavity Walls Supporting Framing Members

(1) Floor joists supported on *cavity walls* shall be supported on solid units not less than 57 mm high.

(2) Floor joists described in Sentence (1) shall not project into the cavity.

(3) Roof and ceiling framing members bearing on *cavity walls* shall be supported on,

(a) not less than 57 mm of solid masonry, bridging the full thickness of the wall, or

(b) a wood plate not less than 38 mm thick, bearing not less than 50 mm on each wythe.

9.20.8.3. Bearing of Beams and Joists

(1) The bearing area under beams and joists shall be sufficient to carry the supported load.

(2) In no case shall the minimum length of end bearing of beams supported on masonry be less than 90 mm.

(3) The length of end bearing of floor, roof or ceiling joists supported on masonry shall be not less than 40 mm.

9.20.8.4. Support of Beams and Columns

(1) Beams and columns supported on masonry walls shall be supported on pilasters where the thickness of the masonry wall or wythe is less than 190 mm.

(2) Not less than 190 mm depth of solid masonry or concrete shall be provided under the beam or column referred to in Sentence (1).

(3) Pilasters required in Sentence (1) shall be bonded or tied to masonry walls.

(4) Concrete pilasters required in Sentence (1) shall be not less than 50 mm by 300 mm.

(5) Unit masonry pilasters required in Sentence (1) shall be not less than 100 mm by 290 mm.

9.20.8.5. Distance to Edge of Supporting Members

(1) Masonry veneer of hollow units resting on bearing support shall not project more than,

(a) 30 mm beyond the supporting base where the veneer is not less than 90 mm thick, and

(b) 12 mm beyond the supporting base where the veneer is less than 90 mm thick.

(2) Masonry veneer of solid units resting on bearing support shall not project more than one third of the width of the veneer.

(3) Where the masonry veneer described in Sentence (2) is rough stone masonry,

(a) the projection shall be measured as the average projection of the units, and

(b) the width of the veneer shall be measured as the average width of the veneer.

9.20.9. Bonding and Tying

9.20.9.1. Joints to be Offset or Reinforced

(1) Vertical joints in adjacent masonry courses shall be offset unless each wythe of masonry is reinforced with the equivalent of no fewer than 2 corrosion-resistant steel bars of 3.76 mm diam placed in the horizontal joints at vertical intervals not exceeding 460 mm.

(2) Where joints in the reinforcing referred to in Sentence (1) occur, the bars shall be lapped not less than 150 mm.

9.20.9.2. Bonding or Tying of Other than Masonry Veneer

(1) Except as provided in Article 9.20.9.5 for masonry veneer, masonry walls that consist of 2 or more wythes shall have the wythes bonded or tied together with masonry bonding units as described in Article 9.20.9.3. or with metal ties as described in Articles 9.20.9.4.

9.20.9.3. Bonding

(1) Where wythes are bonded together with masonry units, the bonding units shall comprise not less than 4 per cent of the wall surface area.

(2) Bonding units described in Sentence (1) shall be spaced not more than 600 mm vertically and horizontally in the case of brick masonry and 900 mm o.c. in the case of block or tile.

(3) Units described in Sentence (1) shall extend not less than 90 mm into adjacent wythes.

9.20.9.4. Tying

(1) Where 2 or more wythes are tied together with metal ties of the individual rod type, the ties shall conform to the requirements in Sentences (3) to (6).

(2) Other ties may be used where it can be shown that such ties provide walls that are at least as strong and as durable as those made with the individual rod type.

(3) Metal ties of the individual rod type shall,

(a) be corrosion-resistant,

(b) have a minimum cross-sectional area of not less than 17.8 mm^2, and

(c) have not less than a 50 mm portion bent at right angles at each end.

(4) Metal ties of the individual rod type shall,

(a) extend from within 25 mm of the outer face of the wall to within 25 mm of the inner face of the wall,

(b) be completely embedded in mortar except for the portion exposed in *cavity walls*, and

(c) be staggered from course to course.

(5) Where 2 or more wythes in walls other than *cavity walls* and masonry veneer/masonry back-up walls are tied together with metal ties of the individual rod type, the space between wythes shall be completely filled with mortar.

(6) Ties described in Sentence (5) shall be,

(a) located within 300 mm of openings and spaced not more than 900 mm apart around openings, and

(b) spaced not more than 900 mm apart horizontally and 460 mm apart vertically at other locations.

(7) Except as required in Sentences (8) and (9), where the inner and outer wythes of *cavity walls* are tied with individual wire ties, the ties shall be spaced not more than 900 mm apart horizontally and 400 mm apart vertically.

(8) Within 100 mm of the bottom of each floor or roof assembly where the cavity extends below the assemblies, the ties described in Sentence (7) shall be spaced not more than 600 mm apart horizontally.

(9) Within 300 mm of any openings, the ties described in Sentence (7) shall be spaced not more than 900 mm apart.

9.20.9.5. Ties for Masonry Veneer

(1) Masonry veneer 70 mm or more in thickness and resting on a bearing support shall be tied to masonry back-up or to wood framing members with straps that are,

(a) corrosion-resistant,

(b) not less than 0.76 mm thick,

(c) not less than 22 mm wide,

(d) shaped to provide a key with the mortar, and

(e) spaced in accordance with Table 9.20.9.5.

Table 9.20.9.5.
Veneer Tie Spacing

Forming Part of Sentence 9.20.9.5.(1)

COLUMN 1	COLUMN 2
Maximum Vertical Spacing, mm	Maximum Horizontal Spacing, mm
400	800
500	600
600	400

(2) The straps described in Sentence (1) that are fastened to the wood framing members shall be,

(a) bent at a right angle within 6 mm from the fastener, and

(b) fastened with corrosion resistant 3.18 mm diam. screws or spiral nails having a wood penetration of not less than 30 mm.

(3) Masonry veneer individually supported by masonry or wood-frame back-up shall be secured to the back-up in conformance with Subsection 4.3.2.

(4) The straps described in Sentence (1) may be installed against one of the sheathings listed in Table 9.23.16.2.A. provided that,

(a) the tie is in contact with the exterior surface of the sheathing, and

(b) the sheathing beneath the tie is not compressed.

9.20.9.6. Reinforcing for Glass Block

(1) Glass block shall have horizontal joint reinforcement of 2 corrosion-resistant bars of not less than 3.76 mm or expanded metal strips not less than 75 mm wide,

(a) spaced at vertical intervals of not more than 600 mm for units 190 mm or less in height, and

(b) installed in every horizontal joint for units higher than 190 mm.

(2) Reinforcement required in Sentence (1) shall be lapped not less than 150 mm.

9.20.10. Lateral Support

9.20.10.1. Lateral Support Required

(1) Masonry walls shall be laterally supported by floor or roof construction or by intersecting masonry walls or buttresses.

(2) The spacing of supports required in Sentence (1) shall be not more than,

(a) 20 times the wall thickness for all *loadbearing* walls and exterior non-*loadbearing* walls, and

(b) 36 times the wall thickness for interior non-*loadbearing* walls.

(3) In applying Sentence (2), the thickness of *cavity walls* shall be taken as the greater of,

(a) two-thirds of the sum of the thicknesses of the wythes, or

(b) the thickness of the thicker wythe.

(4) Floor and roof constructions providing lateral support for walls as required in Sentence (1) shall be constructed to transfer lateral loads to walls or buttresses approximately at right angles to the laterally supported walls.

9.20.11. Anchorage of Roofs, Floors and Intersecting Walls

9.20.11.1. Anchorage of Floor or Roof Assemblies

(1) Where required to receive lateral support, masonry walls shall be anchored to each floor or roof assembly at maximum intervals of 2 000 mm, except that anchorage of floor joists not more than 1 000 mm above *grade* may be omitted.

(2) Anchors required in Sentence (1) shall be corrosion-resistant and be not less than the equivalent of 40 mm by 4.76 mm thick steel straps.

(3) Anchors required in Sentence (1) shall be shaped to provide a mechanical key with the masonry and shall be securely fastened to the horizontal support to develop the full strength of the tie.

(4) When joists are parallel to the wall, anchors required in Sentence (1) shall extend across no fewer than 3 joists.

9.20.11.2. Bonding and Tying of Intersecting Walls

(1) Where required to provide lateral support, intersecting walls shall be bonded or tied together.

(2) Where bonding is used to satisfy the requirements of Sentence (1), 50% of the adjacent masonry units in the intersecting wall, distributed uniformly over the height of the intersection, shall be imbedded in the laterally supported wall.

(3) Where tying is used to satisfy the requirements of Sentence (1), the ties shall be,

(a) corrosion-resistant metal,

(b) equivalent to not less than 4.76 mm by 40 mm steel strapping,

(c) spaced not more than 800 mm o.c. vertically, and

(d) shaped at both ends to provide sufficient mechanical key to develop the strength of the ties.

9.20.11.3. Wood Frame Walls Intersecting Masonry Walls

(1) Wood-frame walls shall be tied to intersecting masonry walls with not less than 4.76 mm diam corrosion-resistant steel rods spaced not more than 900 mm o.c. vertically.

(2) Ties required in Sentence (1) shall be anchored to the wood framing at one end and shaped to provide a mechanical key at the other end to develop the strength of the tie.

9.20.11.4. Wood Frame Roof Systems

(1) Except as permitted in Sentence (2), roof systems of wood-frame construction shall be tied to exterior walls by not less than 12.7 mm diam anchor bolts,

(a) spaced not more than 2 400 mm apart,

(b) embedded not less that 90 mm into the masonry, and

(c) fastened to a rafter plate of not less than 38 mm thick lumber.

(2) The roof system described in Sentence (1) is permitted to be anchored by nailing the wall furring strips to the side of the rafter plate.

9.20.11.5. Cornices, Sills and Trim

(1) Cornices, sills or other trim of masonry material that project beyond the wall face shall have not less than 65% of their mass, but not less than 90 mm, within the wall or shall be adequately anchored to the wall with corrosion-resistant anchors.

9.20.11.6. Piers

(1) Where anchor bolts are to be placed in the top of a masonry pier, the pier shall conform to the requirements of Sentence 9.15.2.3.(4) and shall be capped with concrete or reinforced masonry not less than 200 mm thick.

9.20.12. Corbelling

9.20.12.1. Corbelling

(1) All corbelling shall consist of solid units.

(2) The units referred to in Sentence (1) shall be corbelled so that the horizontal projection of any unit does not exceed 25 mm and the total projection does not exceed one-third of the total wall thickness.

9.20.12.2. Corbelling for Cavity Walls

(1) *Cavity walls* of greater thickness than the *foundation* wall on which they rest shall not be corbelled but may project 25 mm over the outer face of the *foundation* wall disregarding parging.

(2) Where the *foundation* wall referred to in Sentence (1) is unit masonry, it is permitted to be corbelled to meet flush with the inner face of a *cavity wall* provided,

(a) the projection of each course does not exceed half the height or one-third the width of the corbelled unit, and

(b) the total corbel does not exceed one-third of the *foundation* wall thickness.

9.20.12.3. Corbelling for Masonry Veneer

(1) Masonry veneer resting on a bearing support shall not project more than 25 mm beyond the supporting base where the veneer is at least 90 mm thick, and 12 mm beyond the supporting base where the veneer is less than 90 mm thick.

(2) In the case of rough stone veneer, the projection, measured as the average projection of the stone units, shall not exceed one-third the bed width beyond the supporting base.

9.20.13. Control of Rain Water Penetration

9.20.13.1. Materials for Flashing

(1) Material used for flashing shall conform to Table 9.20.13.1.

(2) Aluminum flashing in contact with masonry or concrete shall be effectively coated or separated from the masonry or concrete by an impervious membrane.

Table 9.20.13.1.
Flashing Material

Forming Part of Sentence 9.20.13.1.(1)

COLUMN 1	COLUMN 2	COLUMN 3
Material	Minimum Thickness, mm	
	Exposed Flashing	Concealed Flashing
Aluminum	0.48	—
Copper	0.46	0.46
Copper or aluminum laminated to felt or kraft paper	—	0.05
Hot dipped or galvanized steel	0. 33	0.33
Lead sheet	1.73	1.73
Polyethylene	—	0.50
Roll roofing, Type S	—	standard
Zinc	0.46	0.46

9.20.13.2. Fastening of Flashing

(1) Fastening devices for flashing shall be corrosion-resistant and where metal flashing is used, shall be compatible with the flashing with respect to galvanic action.

9.20.13.3. Location of Flashing

(1) Flashing shall be installed in masonry and masonry veneer walls,

(a) beneath jointed masonry window sills,

(b) over the back and top of parapet walls,

(c) over the heads of glass block panels, beneath weep holes, and

(d) over the heads of window and door openings in exterior walls when the vertical distance between the top of a window or door frame and the bottom edge of the eave exceeds one-quarter of the horizontal eave overhang.

(2) Throughwall flashing shall be provided in a masonry veneer wall such that any moisture that accumulates in the air space will be directed to the exterior of the *building*.

9.20.13.4. Extension of Flashing

(1) A flashing may be deleted when the masonry at the sill of a wall opening or the top of a wall is protected by an impervious non-jointed masonry coping that conforms to Article 9.20.13.12.

(2) When installed beneath jointed masonry window sills and jointed masonry copings or over the heads of openings, flashing shall extend from the front edge of the masonry up behind the sill or lintel.

9.20.13.5. Flashing for Weep Holes in Masonry Veneer/Masonry Walls

(1) Flashing beneath weep holes in *cavity walls* and masonry veneer/masonry back-up walls shall,

(a) be bedded not less than 25 mm in the inside wythe,

(b) extend to not less than 5 mm beyond the outer face of the *building* element below the flashing, and

(c) be installed with a nominally horizontal slope toward the outside wythe.

9.20.13.6. Flashing for Weep Holes in Veneer

(1) Flashing beneath weep holes in masonry veneer over masonry back-up walls shall conform to the flashing requirements for *cavity walls* and masonry veneer/masonry back-up walls in Article 9.20.13.5.

(2) Flashing beneath weep holes in masonry veneer over wood-frame walls shall be installed so that it extends from a point not less than 5 mm beyond the outer face of the *building* element below the flashing to a point 150 mm up the wood frame wall.

(3) Where the frame wall is sheathed with a sheathing membrane, a non-wood-based rigid exterior insulating sheathing or a semi-rigid insulating sheathing with an integral sheathing membrane, the flashing shall be installed behind the sheathing membrane or insulating sheathing.

(4) Flashing described in Sentence (2) is permitted to conform to the requirements for concealed flashing in Table 9.20.13.1.

9.20.13.7. Flashing Joints

(1) Joints in flashing shall be made watertight.

9.20.13.8. Required Weep Holes

(1) Weep holes spaced not more than 800 mm apart shall be provided at the bottom of,

(a) cavities in *cavity walls*, and

(b) cavities or air spaces in masonry veneer walls.

(2) The cavities or air spaces described in Sentence (1) shall include those above lintels over window and door openings required to be flashed in conformance with Article 9.20.13.3.

(3) The weep holes required in Sentence (1) shall be in a location such that any water that collects in the cavity or space will be directed to the exterior of the *building*.

9.20.13.9. Protection of Interior Finish

(1) Except as provided in Sentence (3), where the interior finish of the exterior walls of a *building* is a type that may be damaged by moisture, exterior masonry walls, other than *cavity walls* or walls that are protected for their full height by a roof of a carport or porch, shall be,

(a) parged on the interior surface, and

(b) covered with No. 15 breather-type asphalt-saturated paper conforming to CAN/CGSB-51.32-M, "Sheathing, Membrane, Breather Type", and shall be lapped not less than 100 mm at the joints.

(2) In situations described in Sentence (1), flashing shall be provided where water will accumulate, to lead it to the exterior.

(3) Where the insulation effectively limits the passage of water vapour and is applied by a waterproof adhesive or by mortar directly to the masonry, the requirements for sheathing paper do not apply.

9.20.13.10. Mortar Droppings

(1) *Cavity walls* shall be constructed so that mortar droppings are prevented from forming a bridge to allow the passage of rain water across the cavity.

9.20.13.11. Caulking at Door and Window Frames

(1) The junction of door and window frames with masonry shall be caulked in conformance with Subsection 9.27.4.

9.20.13.12. Drips Beneath Window Sills

(1) Except for wall openings located less than 150 mm above ground level, where a concealed flashing is not installed beneath window and door sills, such sills shall be provided with an outward slope and a drip located not less than 25 mm from the wall surface.

9.20.14. Protection During Work

9.20.14.1. Laying Temperature of Mortar and Masonry

(1) Mortar and masonry shall be maintained at a temperature not below 5°C during installation and for not less than 48 h after installation.

(2) No frozen material shall be used in the mortar mix.

9.20.14.2. Protection from Weather

(1) The top surface of uncompleted masonry exposed to the weather shall be completely covered with a waterproofing material when construction is not in progress.

9.20.15. Reinforcement for Earthquake Resistance

9.20.15.1. Amount of Reinforcement

(1) Where reinforcement is required in this Section, masonry walls shall be reinforced horizontally and vertically with steel having a total cross-sectional area of not less than 0.002 times the horizontal cross-sectional area of the wall, so that not less than one-third of the required steel area is installed either horizontally or vertically and the remainder in the other direction.

9.20.15.2. Installation Standard

(1) Where reinforcement for masonry is required in this Section, it shall be installed in conformance with the requirements for reinforced masonry as contained in CSA A371, "Masonry Construction for Buildings".

9.20.16. Corrosion Resistance

9.20.16.1. Corrosion Resistance of Connectors

(1) Carbon steel connectors required to be corrosion-resistant shall be galvanized to at least the minimum standards in Table 9.20.16.1.

Table 9.20.16.1.
Minimum Requirements for Galvanizing

Forming Part of Sentence 9.20.16.1.(1)

COLUMN 1	COLUMN 2	COLUMN 3
Connector Material	ASTM Standard	Coating Class
Wire ties and continuous reinforcing (hot-dipped galvanizing)	A153 / A153M	Class B2 or 458 g/m^2
Hardware and bolts	A153 / A153M	See A153 / A153M
Strip, plate, bars, and rolled sections (not less than 3.18 mm thick)	A123 / A123M	610 g/m^2
Sheet (less than 3.18 mm thick)	A123 / A123M	305 g/m^2 on material 0.76 mm thick(1)

Notes to Table 9.20.16.1.:

(1) ASTM A123 / A123M does not apply to metal less than 3.18 mm thick. Galvanizing coatings may be interpolated for thicknesses between 3.18 mm and 0.76 mm.

9.20.17. Above-Ground Flat Insulating Concrete Form Walls

9.20.17.1. Thickness of Flat Insulating Concrete Form Walls

(1) The thickness of concrete in flat insulating concrete form walls not in contact with the ground shall be,

(a) not less than 140 mm, and

(b) constant for the entire height of the wall.

9.20.17.2. Reinforcement for Flat Insulating Concrete Form Walls

(1) Horizontal reinforcement in above-grade flat insulating concrete form walls shall,

(a) consist of,

 (i) one 10M bar placed not more than 300 mm from the top of the wall, and

 (ii) 10M bars spaced not more than 600 mm o.c., and

(b) be placed in the middle third of the wall section.

(2) Vertical reinforcement in above-grade flat insulating concrete form walls shall,

(a) consist of 10M bars spaced not more than 400 mm o.c., and

(b) be placed in the middle third of the wall section.

(3) Vertical reinforcement required in Sentence (2) and interrupted by wall openings shall be placed not more than 600 mm from each side of the opening.

9.20.17.3. Openings in Flat Non-Loadbearing Insulating Concrete Form Walls

(1) No openings shall occur within 1 200 mm of interior and exterior corners of exterior non-*loadbearing* flat insulating concrete form walls.

(2) Portions of walls over openings in non-*loadbearing* flat insulating concrete form walls shall have a minimum depth of concrete of not less than 200 mm over the width of the opening.

(3) Openings more than 600 mm but not more than 3 000 mm in width in non-*loadbearing* flat insulating concrete form walls shall be reinforced at the top and bottom with one 10M bar.

(4) Openings more than 3 000 mm in width in non-*loadbearing* flat insulating concrete form walls shall be reinforced on all four sides with two 10M bar.

(5) Reinforcing bars described in Sentences (3) and (4) shall extend not less than 600 mm beyond the edges of the opening.

(6) The cumulative width of openings in non-*loadbearing* flat insulating concrete form walls shall be not more than 70% of the length of any wall.

9.20.17.4. Lintels over Openings in Loadbearing Flat Insulating Concrete Form Walls

(1) In *loadbearing* flat insulating concrete form walls, lintels shall be provided over all openings wider than 900 mm.

(2) Lintels described in Sentence (1) shall be constructed in accordance with Tables A-17, A-18 or A-19.

(3) Lintels described in Sentence (1) over openings wider than 1 200 mm shall be reinforced for shear with 10M stirrups at a maximum spacing of half the distance from the bottom reinforcing bar to the top of the lintel.

9.20.17.5. Framing Supported on Flat Insulating Concrete Form Walls

(1) Floor joists supported on the side of flat insulating concrete form walls shall be supported with joist hangers secured to wood ledger boards.

(2) The ledger boards described in Sentence (1) shall be not less than,

(a) 38 mm thick, and

(b) the depth of the floor joists.

(3) Anchor bolts shall be used to secure ledger boards to insulating concrete form walls and shall be,

(a) embedded in the wall to a depth not less than 100 mm, and

(b) spaced in accordance with Table 9.20.17.5.

(4) Floor joists and *building* frames supported on top of flat insulating concrete form walls shall be anchored in conformance with Article 9.23.6.1.

Table 9.20.17.5.
Maximum Anchor Bolt Spacing for the Connection of Ledger Boards to Flat Insulating Concrete Form Walls

Forming Part of Sentence 9.20.17.5.(3)

COLUMN 1	COLUMN 2	COLUMN 3
Maximum Clear Floor Span, m	Maximum Anchor Bolt Spacing, mm	
	Staggered 12.7 mm Diameter Anchor Bolts	Staggered 16 mm Diameter Anchor Bolts
2.44	450	500
3.00	400	450
4.00	300	400
5.00	275	325

9.20.17.6. Anchoring of Roof Framing to Top of Flat Insulating Concrete Form Walls

(1) Roof framing supported on the top of flat insulating concrete form walls shall be fixed to the top plates, which shall be anchored to the wall with anchor bolts,

(a) not less than 12.7 mm in diameter, and

(b) spaced not more than 1 200 mm o.c.

(2) The anchor bolts described in Sentence (1) shall be placed in the centre of the insulating concrete form wall and shall be embedded not less than 100 mm into the concrete.

(3) Attachment of roof framing to wood top plates shall be in accordance with Table 9.23.3.4.

9.20.17.7. Protection from Precipitation and Damage

(1) Above ground flat insulating concrete form walls shall be protected from precipitation and damage in conformance with Section 9.27.

Section 9.21. Masonry and Concrete Chimneys and Flues

9.21.1. General

9.21.1.1. Application

(1) This Section applies to,

(a) rectangular *masonry or concrete chimneys* not more than 12 m in height serving fireplaces or serving *appliances* having a combined total rated heat output of 120 kW or less, and

(b) *flue pipes* serving solid fuel-burning *appliances*.

(2) *Chimneys* and *flue pipes* other than those described in Sentence (1) shall conform to Section 6.3.

9.21.1.2. Factory-Built Chimneys

(1) *Factory-built chimneys* serving solid fuel-burning *appliances*, and their installation, shall conform to CAN/ULC-S629-M, "650°C Factory-Built Chimneys".

9.21.1.3. Chimneys, Gas Vents or Flue Pipes

(1) Except as provided in Sentence (2), *chimneys* (other than those described in Sentences 9.21.1.1.(1) and 9.21.1.2.(1)), *gas vents* and *flue pipes* serving gas-, oil- or solid fuel-burning *appliances* and associated equipment shall conform to Section 6.3.

(2) *Flue pipes* serving solid fuel-burning *stoves*, *ranges* and *space heaters* shall conform to CAN/CSA-B365, "Installation Code for Solid-Fuel Burning Appliances and Equipment".

9.21.1.4. Chimney or Flue Pipe Walls

(1) The walls of any *chimney* or *flue pipe* shall be constructed to be smoke- and flame-tight.

9.21.2. Chimney Flues

9.21.2.1. Chimney Flue Limitations

(1) A *chimney flue* that serves a fireplace or incinerator shall not serve any other *appliance*.

(2) A *chimney flue* that serves a solid fuel-burning *appliance* shall not be connected to a natural gas- or propane-fired *appliance*.

(3) A *chimney flue* that serves a solid-fuel burning *appliance* shall not be connected to an oil-burning *appliance* unless the solid-fuel burning *appliance* is *listed* for such installation and the installation of both *appliances* meets their respective installation requirements.

9.21.2.2. Connections of More Than One Appliance

(1) Except as required in Article 9.21.2.1., two or more fuel-burning *appliances* are permitted to be connected to the same *chimney flue* provided adequate draft is maintained for the connected *appliances* and the connections are made as described in Sentences (2) and (3).

(2) Where 2 or more solid fuel-burning *appliances* are connected to the same *chimney flue*, the *appliances* must be located on the same *storey*.

(3) The connection referred to in Sentence (2) for a solid fuel-burning *appliance* shall be made below connections for *appliances* burning other fuels.

9.21.2.3. Inclined Chimney Flues

(1) *Chimney flues* shall not be inclined more than 45° to the vertical.

9.21.2.4. Size of Chimney Flues

(1) Except for *chimneys* serving fireplaces, the size of a *chimney flue* shall conform to the requirements of the solid fuel-burning *appliance* installation standard referenced in Sentence 6.2.1.4.(1) and Article 9.33.1.2.

(2) Where a *chimney flue* serves only one solid fuel-burning *appliance*, the *flue* area shall be at least equal to that of the *flue pipe* connected to it.

9.21.2.5. Fireplace Chimneys

(1) The size of a *chimney flue* serving a masonry fireplace shall be within the allowable range specified in Table 9.21.2.5.A. or Table 9.21.2.5.B.

Table 9.21.2.5.A.
Diameter of Round Flues for Fireplace Chimneys

Forming Part of Sentence 9.21.2.5.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9
Fireplace Opening, m²	*Chimney* Height, m							
	3.0 to 4.5		> 4.5 to 5.9		> 5.9 to 8.9		> 8.9 to 12	
	Flue diameter, mm							
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Up to 0.150	110	170	100	160	90	150	90	150
0.151 to 0.250	150	210	130	190	130	190	120	180
0.251 to 0.350	180	240	160	220	150	210	140	200
0.351 to 0.500	220	280	200	260	190	250	170	230
0.501 to 0.650	260	320	230	290	220	280	200	260
0.651 to 0.800	290	350	260	320	240	300	220	280
0.801 to 1.00	330	390	290	350	270	330	250	310
1.01 to 1.20	360	420	320	380	300	360	270	330
1.21 to 1.40	390	450	350	410	330	390	300	360
1.41 to 1.60	420	480	380	440	350	410	320	380
1.61 to 1.80	—	—	400	460	370	430	340	400
1.81 to 2.00	—	—	—	—	400	460	360	420
2.01 to 2.20	—	—	—	—	—	—	380	440

Table 9.21.2.5.B.
Rectangular Flue Sizes for Fireplace Chimneys

Forming Part of Sentence 9.21.2.5.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9
Fireplace Opening, m²	*Chimney* Height, m							
	3.0 to 4.5		> 4.5 to 5.9		> 5.9 to 8.9		> 8.9 to 12	
	Flue Size, mm							
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Up to 0.150	200 × 200	200 × 200	100 × 200	100 × 200	100 × 200	100 × 200	100 × 200	100 × 200
0.151 to 0.250	200 × 200	200 × 200	200 × 200	200 × 200	200 × 200	200 × 200	200 × 200	200 × 200
0.251 to 0.350	200 × 300	200 × 300	200 × 200	200 × 300	200 × 200	200 × 200	200 × 200	200 × 200
0.351 to 0.500	300 × 300	300 × 300	200 × 300	200 × 300	200 × 300	200 × 300	200 × 200	200 × 300
0.501 to 0.650	300 × 300	300 × 400	300 × 300	300 × 300	300 × 300	300 × 300	200 × 300	200 × 300
0.651 to 0.800	300 × 400	300 × 400	300 × 300	300 × 400	300 × 300	300 × 300	300 × 300	300 × 300
0.801 to 1.00	400 × 400	400 × 400	300 × 400	300 × 400	300 × 400	300 × 400	300 × 300	300 × 300
1.01 to 1.20	400 × 400	400 × 400	400 × 400	400 × 400	300 × 400	300 × 400	300 × 400	300 × 400
1.21 to 1.40	—	—	400 × 400	400 × 400	400 × 400	400 × 400	300 × 400	300 × 400
1.41 to 1.60	—	—	—	—	400 × 400	400 × 400	400 × 400	400 × 400
1.61 to 1.80	—	—	—	—	—	—	400 × 400	400 × 400
1.81 to 2.00	—	—	—	—	—	—	400 × 400	400 × 400

9.21.2.6. Oval Chimney Flues

(1) The width of an oval *chimney flue* shall be not less than two-thirds its breadth.

9.21.3. Chimney Lining

9.21.3.1. Lining Materials

(1) Every *masonry or concrete chimney* shall have a lining of clay, concrete, firebrick or metal.

9.21.3.2. Joints in Chimney Liners

(1) Joints of *chimney liners* shall be sealed to provide a barrier to the passage of flue gases and condensate into the cavity between the liner and the surrounding masonry.

(2) Joints of clay, concrete or firebrick *chimney liners* shall be struck flush to provide a straight, smooth, aligned *chimney flue*.

9.21.3.3. Clay Liners

(1) Clay liners shall conform to CAN/CSA-A324-M, "Clay Flue Liners".

(2) Liners referred to in Sentence (1) shall be not less than 15.9 mm thick and shall be capable of resisting, without softening or cracking, a temperature of 1100°C.

9.21.3.4. Firebrick Liners

(1) Firebrick liners shall conform to ASTM C27, "Classification of Fireclay and High Alumina Refractory Brick".

(2) Firebrick liners shall be laid with high temperature cement mortar conforming to CAN/CGSB-10.3, "Air Setting Refractory Mortar".

9.21.3.5. Concrete Liners

(1) Concrete *flue* liners shall conform to Clause 4.2.6.4. of CAN/CSA-A405-M, "Design and Construction of Masonry Chimneys and Fireplaces".

9.21.3.6. Metal Liners

(1) Metal liners shall be constructed of at least 0.3 mm thick stainless steel.

(2) Except as permitted in Sentence 9.22.10.2.(3), metal liners referred to in Sentence (1) shall only be used in *chimneys* serving gas- or oil-burning *appliances*.

9.21.3.7. Installation of Chimney Liners

(1) *Chimney liners* shall be installed when the surrounding masonry or concrete is placed.

9.21.3.8. Spaces Between Liners and Surrounding Masonry

(1) A space not less than 10 mm wide shall be left between a *chimney liner* and the surrounding masonry.

(2) The space required in Sentence (1) shall not be filled with mortar.

9.21.3.9. Mortar for Chimney Liners

(1) *Chimney liners* used in *chimneys* for solid fuel-burning *appliances* shall be laid in a full bed of,

(a) high temperature cement mortar conforming to CAN/CGSB-10.3, "Air Setting Refractory Mortar", or

(b) mortar consisting of 1 part Portland cement to 3 parts sand by volume.

(2) *Chimney liners* used in *chimneys* for oil- or gas-burning *appliances* shall be laid in a full bed of mortar consisting of 1 part Portland cement to 3 parts sand by volume.

9.21.3.10. Extension of Chimney Liners

(1) *Chimney liners* shall extend from a point not less than 200 mm below the lowest *flue pipe* connection to a point not less than 50 mm or more than 100 mm above the *chimney* cap.

9.21.4. Masonry and Concrete Chimney Construction

9.21.4.1. Unit Masonry

(1) Unit masonry shall conform to Section 9.20.

9.21.4.2. Concrete

(1) Concrete shall conform to Section 9.3.

9.21.4.3. Footings

(1) Footings for masonry *chimneys* and concrete *chimneys* shall conform to the requirements in Section 9.15.

9.21.4.4. Height of Chimney Flues

(1) A *chimney flue* shall extend not less than,

(a) 900 mm above the highest point at which the *chimney* comes in contact with the roof, and

(b) 600 mm above the highest roof surface or structure within 3 m of the *chimney*.

9.21.4.5. Lateral Stability

(1) Except as provided in Sentence (2), *chimneys* shall be braced in accordance with Subsection 4.3.2. to provide stability under wind loads.

(2) A *chimney* need not be laterally braced provided,

(a) no horizontal outside dimension is less than 400 mm, and

(b) the *chimney* extends not more than 3.6 m above a roof or the masonry wall of which it forms a part.

9.21.4.6. Chimney Caps

(1) The top of a *chimney* shall have a waterproof cap of reinforced concrete, masonry or metal.

(2) The cap required in Sentence (1) shall slope from the lining and be provided with a drip not less than 25 mm from the *chimney* wall.

(3) Cast-in-place concrete caps shall be separated from the *chimney liner* by a bond break and be sealed at that location.

(4) Jointed precast concrete or masonry *chimney* caps shall have flashing installed beneath the cap extending from the liner to the drip edge.

9.21.4.7. Cleanout

(1) Except for a *chimney flue* constructed to serve a masonry fireplace, a cleanout opening with a metal frame and tight-fitting metal door shall be installed near the base of the *chimney flue*.

9.21.4.8. Wall Thickness

(1) The walls of a masonry *chimney* shall be built of solid units not less than 70 mm thick.

9.21.4.9. Separation of Flue Liners

(1) *Flue* liners in the same *chimney* shall be separated by not less than 70 mm of masonry or concrete exclusive of liners where clay liners are used, or 90 mm of firebrick where firebrick liners are used.

(2) *Flue* liners referred to in Sentence (1) shall be installed to prevent significant lateral movement.

9.21.4.10. Flashing

(1) Junctions with adjacent materials shall be adequately flashed to shed water.

9.21.5. Clearance from Combustible Construction

9.21.5.1. Clearance from Combustible Materials

(1) The clearance between *masonry or concrete chimneys* and *combustible* framing material shall be not less than,

(a) 50 mm for interior *chimneys*, and

(b) 12 mm for exterior *chimneys*.

(2) A clearance of not less than 150 mm shall be provided between a cleanout opening and *combustible* material.

(3) *Combustible* flooring, subflooring and ceiling finishes shall have not less than a 12 mm clearance from *masonry or concrete chimneys*.

9.21.5.2. Sealing of Spaces

(1) All spaces between *masonry or concrete chimneys* and *combustible* material shall be sealed top or bottom with *noncombustible* material.

9.21.5.3. Support of Joists or Beams

(1) Joists or beams may be supported on masonry walls that enclose *chimney flues* provided the *combustible* members are separated from the *flue* by a minimum of 290 mm of solid masonry.

Section 9.22. Fireplaces

9.22.1. General

9.22.1.1. Application

(1) Except as otherwise specifically stated in this Part, this Section applies to masonry fireplaces constructed on site.

9.22.1.2. Masonry and Concrete

(1) Except as otherwise stated in this Section, unit masonry shall conform to Section 9.20. and concrete to Section 9.3.

(2) Masonry above openings shall be supported by steel lintels conforming to Sentence 9.20.5.2.(2), reinforced concrete or a masonry arch.

9.22.1.3. Footings

(1) Footings for masonry and concrete fireplaces shall conform to Section 9.15.

9.22.1.4. Combustion Air

(1) Every solid fuel-fired fireplace, including a factory-built fireplace, shall have a supply of combustion air from outdoors in accordance with Sentences (2) to (7).

(2) The combustion air shall be supplied by a *noncombustible* and corrosion-resistant supply duct.

(3) The supply duct shall have,

(a) a diameter of not less than 100 mm or equivalent area, and

(b) an exterior intake for entry of air from the outdoors.

(4) The supply duct shall contain a tight-fitting damper that shall be located close to the interior outlet and be operable from the room containing the fireplace.

(5) The operating mechanism shall clearly indicate the actual position of the damper.

(6) The interior outlet shall,

(a) be located as close as possible to the opening in the face of the fireplace, and

(b) be designed to prevent embers from entering the supply duct.

(7) Where a supply of combustion air is provided directly to the fire chamber of a fireplace, including a factory-built fireplace or a steel fireplace liner, the installation shall comply with the "Outdoor Air Supply" requirements provided in CAN/CSA-A405-M, "Design and Construction of Masonry Chimneys and Fireplaces".

9.22.2. Fireplace Liners

9.22.2.1. Brick or Steel Liners

(1) Except where a fireplace is equipped with a steel liner, every fireplace shall have a firebrick liner.

9.22.2.2. Firebrick Liners

(1) Fireplace liners shall be not less than,

(a) 50 mm thick for the sides and back, and

(b) 25 mm thick for the floor.

(2) Firebrick liners shall be laid with high temperature cement mortar conforming to CAN/CGSB- 10.3, "Air Setting Refractory Mortar".

(3) Joints between a firebrick liner and the adjacent back-up masonry shall be offset.

9.22.2.3. Steel Liners

(1) Steel liners for fireplaces shall conform to CAN/ULC-S639M, "Steel Liner Assemblies for Solid-Fuel Burning Masonry Fireplaces", and shall be installed in accordance with the installation instructions in that standard.

9.22.3. Fireplace Walls

9.22.3.1. Thickness of Walls

(1) Except as provided in Sentence (2), the thickness of the back and sides of a fireplace, including the thickness of any firebrick liner, shall consist of not less than 190 mm thick where a metal liner or a firebrick liner less than 51 mm is used.

(2) When a steel fireplace liner is used with an air circulating chamber surrounding the firebox, the back and sides of the fireplace shall consist of,

(a) solid masonry units not less than 90 mm thick, or

(b) hollow masonry units not less than 190 mm thick.

9.22.4. Fire Chamber

9.22.4.1. Fire Chamber Dimensions

(1) The distance from the back of the fire chamber to the plane of the fireplace opening shall be not less than 300 mm.

9.22.5. Hearth

9.22.5.1. Hearth Extension

(1) Except as required in Sentence (2), fireplaces shall have a *noncombustible* hearth extending not less than 400 mm in front of the fireplace opening measured from the facing, and not less than 200 mm beyond each side of the fireplace opening.

(2) Where the fire chamber floor is elevated more than 150 mm above the hearth, the dimension of the hearth measured perpendicular to the plane of the fireplace opening shall be increased by not less than,

(a) 50 mm for an elevation above 150 mm and not more than 300 mm, and

(b) an additional 25 mm for every 50 mm in elevation above 300 mm.

9.22.5.2. Support of Hearth

(1) Except as permitted in Sentence (2), the fire chamber floor and hearth shall be supported on a reinforced concrete slab not less than a 100 mm thick at its supports and, if cantilevered, not less than 50 mm thick at its unsupported edge.

(2) A hearth for a fireplace with an opening raised not less than 200 mm from a *combustible* floor is permitted to be supported on that floor provided the requirements of Clauses 5.3.6.5. to 5.3.6.7. of CAN/CSA-A405-M, "Design and Construction of Masonry Chimneys and Fireplaces", are followed.

9.22.6. Damper

9.22.6.1. Required Damper and Size

(1) The throat of every fireplace shall be equipped with a metal damper sufficiently large to cover the full area of the throat opening.

9.22.7. Smoke Chamber

9.22.7.1. Slope of Smoke Chamber

(1) The sides of the smoke chamber connecting a fireplace throat with a *flue* shall not be sloped at an angle greater than 45° to the vertical.

9.22.7.2. Wall Thickness

(1) The thickness of masonry walls surrounding the smoke chamber shall be not less than 190 mm at the sides, front and back, except that the portions of the back exposed to the outside may be 140 mm thick.

9.22.8. Factory-Built Fireplaces

9.22.8.1. Conformance to Standard

(1) Factory-built fireplaces and their installation shall conform to CAN/ULC-S610-M, "Factory-Built Fireplaces".

9.22.9. Clearance of Combustible Material

9.22.9.1. Clearance to the Fireplace Opening

(1) *Combustible* material shall not be placed on or near the face of a fireplace within 150 mm of the fireplace opening, except that where the *combustible* material projects more than 38 mm out from the face of the fireplace above the opening, such material shall be at least 300 mm above the top of the opening.

9.22.9.2. Metal Exposed to the Interior

(1) Metal exposed to the interior of a fireplace such as the damper control mechanism shall have at least a 50 mm clearance from any *combustible* material on the face of the fireplace where such metal penetrates through the face of the fireplace.

9.22.9.3. Clearance to Combustible Framing

(1) Not less than a 100 mm clearance shall be provided between the back and sides of a solid fuel burning fireplace and *combustible* framing, except that a 50 mm clearance is permitted where the fireplace is located in an exterior wall.

(2) Not less than a 50 mm clearance shall be provided between the back and sides of the smoke chamber of a solid fuel burning fireplace and *combustible* framing, except that a 25 mm clearance is permitted where the fireplace is located in an exterior wall.

9.22.9.4. Heat Circulating Duct Openings

(1) The clearance of *combustible* material above heat circulating duct openings from those openings shall be not less than,

(a) 300 mm where the *combustible* material projects more than 38 mm from the face, and

(b) 150 mm where the projection is less than 38 mm.

9.22.10. Fireplace Inserts and Hearth-Mounted Stoves

9.22.10.1. Installation Standard

(1) Fireplace inserts and hearth mounted *stoves* vented through the throat of a fireplace shall conform to ULC-S628, "Fireplace Inserts".

9.22.10.2. Installation

(1) The installation of fireplace inserts and hearth mounted *stoves* vented through the throat of a fireplace shall conform to CAN/CSA-B365, "Installation Code for Solid-Fuel Burning Appliances and Equipment".

(2) Fireplace inserts and hearth mounted stoves vented through the throat of a fireplace described in Sentence (1) may be installed in existing fireplaces only if a minimum thickness of 190 mm of solid masonry is provided between the smoke chamber and any existing *combustible* materials, unless the insert is listed for lesser clearances.

(3) A fireplace insert installed in a masonry fireplace shall have,

(a) a *listed* metal *chimney* liner installed from the insert collar to the top of the *chimney*, or

(b) a direct sealed connection to the *chimney flue* where such provision is part of an insert conforming to Sentence 9.22.10.1.(1).

Section 9.23. Wood-Frame Construction

9.23.1. Application

9.23.1.1. Limitations

(1) This Section applies where wall, floor and roof planes are generally comprised of lumber frames of small repetitive structural members, or engineered components, and where,

(a) roof and wall planes are clad, sheathed or braced on at least one side,

(b) the small repetitive structural members are spaced not more than 600 mm o.c.,

(c) the walls do not serve as *foundations*,

(d) the specified *live load* on supported subfloors and floor framing does not exceed 2.4 kPa, and

(e) the span of any structural member does not exceed 12.20 m.

(2) Where the conditions in Sentence (1) are exceeded for wood construction, the design of the framing and fastening shall conform to Subsection 4.3.1.

9.23.2. General

9.23.2.1. Strength and Rigidity

(1) All members shall be so framed, anchored, fastened, tied and braced to provide the necessary strength and rigidity.

9.23.2.2. Protection from Decay

(1) Ends of wood joists, beams and other members framing into masonry or concrete shall be treated to prevent decay where the bottom of the member is at or below ground level, or a 12 mm air space shall be provided at the end and sides of the member.

(2) Air spaces required in Sentence (1) shall not be blocked by insulation, *vapour barriers* or air tight materials.

9.23.2.3. Protection from Dampness

(1) Except as permitted in Sentence (2), wood framing members that are not pressure-treated with a wood preservative and that are supported on concrete in contact with the ground or *fill* shall be separated from the concrete by not less than 0.05 mm polyethylene film or Type S roll roofing.

(2) Dampproofing material referred to in Sentence (1) is not required where the wood member is at least 150 mm above the ground.

9.23.2.4. Lumber

(1) Lumber shall conform to the appropriate requirements in Subsection 9.3.2.

9.23.2.5. Termite Protection

(1) Where termites are known to exist, unless pressure-treated with a chemical that is toxic to such termites in accordance with Article 9.3.2.9., wood steps shall rest on a non-cellulosic base or apron extending at least 150 mm above *grade*.

(2) Wood lattice or skirting around porches shall be separated from piers and *soil* by at least 50 mm.

9.23.3. Fasteners

9.23.3.1. Standards for Nails and Screws

(1) Unless otherwise indicated, nails specified in this Section shall be common steel wire nails or common spiral nails, conforming to CSA B111, "Wire Nails, Spikes and Staples".

(2) Wood screws specified in this Section shall conform to ANSI/ASME B18.6.1., "Wood Screws (Inch Series)".

9.23.3.2. Length of Nails

(1) All nails shall be long enough so that not less than half their required length penetrates into the second member.

9.23.3.3. Prevention of Splitting

(1) Splitting of wood members shall be minimized by staggering the nails in the direction of the grain and by keeping nails well in from the edges.

9.23.3.4. Nailing of Framing

(1) Except as provided in Sentence (2), nailing of framing shall conform to Table 9.23.3.4.

Table 9.23.3.4.
Nailing for Framing

Forming Part of Sentence 9.23.3.4.(1)

COLUMN 1 Construction Detail	COLUMN 2 Minimum Length of Nails, mm	COLUMN 3 Minimum Number or Maximum Spacing of Nails
Floor joist to plate – toe nail	82	2
Wood or metal strapping to underside of floor joists	57	2
Cross bridging to joists	57	2 at each end
Double header or trimmer joists	76	300 mm (o.c.)
Floor joist to stud (balloon construction)	76	2
Ledger strip to wood beam	82	2 per joist
Joist to joist splice (See also Table 9.23.13.8.)	76	2 at each end
Header joist end nailed to joists along perimeter	101	3
Tail joist to adjacent header joist (end nailed) around openings	82	5
	101	3
Each header joist to adjacent trimmer joist (end nailed) around openings	82	5
	101	3
Stud to wall plate (each end) toe nail	62	4
or end nail	82	2
Doubled studs at openings, or studs at walls or wall intersections and corners	76	750 mm (o.c.)
Doubled top wall plates	76	600 mm (o.c.)
Bottom wall plate or sole plate to joists or blocking (exterior walls)(1)	82	400 mm (o.c.)
Interior walls to framing or subflooring	82	600 mm (o.c.)
Horizontal member over openings in non-*loadbearing* walls – each end	82	2
Lintels to studs	82	2 at each end
Ceiling joist to plate – toe nail each end	82	2
Roof rafter, roof truss or roof joist to plate – toe nail	82	3
Rafter plate to each ceiling joist	101	2
Rafter to joist (with ridge supported)	76	3
Rafter to joist (with ridge unsupported)	76	See Table 9.23.13.8.
Gusset plate to each rafter at peak	57	4
Rafter to ridge board – toe nail – end nail	82	3
Collar tie to rafter – each end	76	3
Collar tie lateral support to each collar tie	57	2
Jack rafter to hip or valley rafter	82	2
Roof strut to rafter	76	3
Roof strut to *loadbearing* wall – toe nail	82	2
38 mm × 140 mm or less plank decking to support	82	2
Plank decking wider than 38 mm × 140 mm to support	82	3
38 mm edge laid plank decking to support (toe nail)	76	1
38 mm edge laid plank to each other	76	450 mm (o.c.)

Notes to Table 9.23.3.4.:

(1) See Sentence 9.23.3.4.(2).

(2) Where the bottom wall plate or sole plate of an exterior wall is not nailed to joists or blocking in conformance with Table 9.23.3.4., the exterior wall may be fastened to the floor framing by,

(a) having plywood, OSB or waferboard sheathing extend down over floor framing and fastened to the floor framing by nails or staples conforming to Article 9.23.3.5., or

(b) tying the wall framing to the floor framing by 50 mm wide galvanized-metal strips,

  (i) not less than 0.41 mm in thickness,

(ii) spaced not more than 1 200 mm apart, and

(iii) fastened at each end with at least two 63 mm nails.

9.23.3.5. Fastening for Sheathing or Subflooring

(1) Fastening of sheathing and subflooring shall conform to Table 9.23.3.5.

Table 9.23.3.5.
Fasteners for Sheathing and Subflooring

Forming Part of Sentence 9.23.3.5.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6
Element	Minimum Length of Fasteners, mm				Minimum Number or Maximum Spacing of Fasteners
	Common or Spiral Nails	Ring Thread Nails or Screws	Roofing Nails	Staples	
Board lumber 184 mm or less wide	51	45	N/A	51	2 per support
Board Lumber more than 184 mm wide	51	45	N/A	51	3 per support
Fibreboard sheathing up to 13 mm thick	N/A	N/A	44	28	150 mm (o.c.) along edges and 300 mm (o.c.) along intermediate supports
Gypsum sheathing up to 13 mm thick	N/A	N/A	44	N/A	
Plywood, OSB or waferboard up to 10 mm thick	51	45	N/A	38	
Plywood, OSB or waferboard from 10 mm to 20 mm thick	51	45	N/A	51	
Plywood, OSB or waferboard over 20 mm thick	57	51	N/A	N/A	

(2) Staples shall not be less than 1.6 mm in diameter or thickness, with not less than a 9.5 mm crown driven with the crown parallel to framing.

(3) Roofing nails for the attachment of fibreboard or gypsum sheathing shall not be less than 3.2 mm in diameter with a minimum head diameter of 11.1 mm.

(4) Flooring screws shall not be less than 3.2 mm in diameter.

9.23.4. Maximum Spans

9.23.4.1. Application

(1) Spans provided in this Subsection for joists, beams and lintels supporting floors shall apply only where,

(a) the floors serve residential areas as described in Table 4.1.5.3., or

(b) the uniformly distributed *live load* on the floors do not exceed that specified for residential areas as described in Table 4.1.5.3.

(2) Spans for joists, beams and lintels supporting floors shall be determined according to Subsection 4.1.3. where the supported floors,

(a) serve other than residential areas, or

(b) support a uniform *live load* in excess of that specified for residential areas.

9.23.4.2. Spans for Joists, Rafters and Beams

(1) Except as required in Sentence (2) and Article 9.23.13.10., the spans for wood joists and rafters shall conform to the spans shown in Tables A-1 to A-7 for the uniform *live loads* shown in the Tables.

(2) Spans for floor joists that are not selected from Tables A-1 and A-2 and that are required to be designed for the same loading conditions, shall not exceed the design requirements for uniform loading and vibration criteria.

(3) Spans for built-up wood and glued-laminated timber floor beams shall conform to the spans in Tables A-8 to A-11.

(4) Spans for roof ridge beams shall conform to the spans in Table A-12 for the uniform snow load shown.

9.23.4.3. Steel Beams

(1) The spans for steel beams with laterally supported top flanges shall conform to Table 9.23.4.3. for floors and Tables A-20 to A-29 for roofs and floors.

(2) Beams described in Sentence (1) shall at least meet the requirements for Grade 350 W steel in CAN/CSA-G40.21, "Structural Quality Steel".

(3) A beam may be considered to be laterally supported if,

(a) the wood joists bear on its top flange at intervals of 600 mm or less over its entire length,

(b) the load being applied to this beam is transmitted through the joists, and

(c) 19 mm by 38 mm wood strips in contact with the top flange are nailed on both sides of the beam to the bottom of the joist supported.

Table 9.23.4.3.
Maximum Spans for Steel Beams Supporting Floors in Dwelling Units

Forming Part of Sentence 9.23.4.3 (1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8
	Supported Joist Length, m (Half the sum of joist spans on both sides of the beam)						
	2.4	3.0	3.6	4.2	4.8	5.4	6.0
Section	One *Storey* Supported						
W150 × 22	5.5	5.2	4.9	4.8	4.6	4.5	4.3
W200 × 21	6.5	6.2	5.9	5.7	5.4	5.1	4.9
W200 × 27	7.3	6.9	6.6	6.3	6.1	5.9	5.8
W200 × 31	7.8	7.4	7.1	6.8	6.6	6.4	6.2
W250 × 24	8.1	7.6	7.3	7.0	6.6	6.2	5.9
W250 × 33	9.2	8.7	8.3	8.0	7.7	7.5	7.3
W250 × 39	10.0	9.4	9.0	8.6	8.4	8.1	7.9
W310 × 31	10.4	9.8	9.4	8.9	8.4	8.0	7.6
W310 × 39	11.4	10.7	10.2	9.8	9.5	9.2	9.0
Section	Two *Storeys* Supported						
W150 × 22	4.9	4.4	4.1	3.8	3.5	3.4	3.2
W200 × 21	5.6	5.1	4.6	4.3	4.1	3.8	3.7
W200 × 27	6.4	6.1	5.6	5.3	4.9	4.7	4.4
W200 × 31	6.9	6.5	6.2	5.8	5.4	5.1	4.9
W250 × 24	6.8	6.1	5.6	5.2	4.9	4.6	4.4
W250 × 33	8.2	7.7	7.0	6.5	6.1	5.8	5.5
W250 × 39	8.8	8.3	7.8	7.2	6.8	6.4	6.1
W310 × 31	8.7	7.8	7.2	6.7	6.2	5.9	5.6
W310 × 39	10.0	9.3	8.5	7.9	7.4	7.0	6.7

9.23.4.4. Concrete Topping

(1) Except as permitted in Sentence (2), where a floor is required to support a concrete topping, the joist spans shown in Table A-1 or the spacing of the members shall be reduced to allow for the loads due to the topping.

(2) Where a floor is required to support a concrete topping, joist spans are permitted to be selected from Table A-2 provided the concrete,

(a) is 38 to 51 mm thick,

(b) is normal weight,

(c) is placed directly on the subflooring, and

(d) has not less than 20 MPa compressive strength after 28 days.

(3) Where a floor is required to support a concrete topping not more than 51 mm thick, the beam spans shown in Tables A-8 to A-11 shall be multiplied by 0.8 or the supported length of the floor joists shall be reduced to allow for the loads due to the topping.

9.23.4.5. Heavy Roofing Materials

(1) Where a roof is required to support an additional uniform *dead load* from roofing materials such as concrete roofing tile, or materials other than as specified in Section 9.26., such as clay roofing tiles, the additional load shall be allowed for by reducing,

(a) the spans for roof joists and rafters in Tables A-4 to A-7, or the spacing of the members, and

(b) the spans for ridge beams and lintels in Tables A-12 to A-16.

9.23.5. Notching and Drilling

9.23.5.1. Holes Drilled in Framing Members

(1) Holes drilled in roof, floor or ceiling framing members shall be not larger than one-quarter the depth of the member and shall be located not less than 50 mm from the edges, unless the depth of the member is increased by the size of the hole.

9.23.5.2. Notching of Framing Members

(1) Floor, roof and ceiling framing members are permitted to be notched provided the notch is located on the top of the member within half the joist depth from the edge of bearing and is not deeper than one-third the joist depth, unless the depth of the member is increased by the size of the notch.

9.23.5.3. Wall Studs

(1) Wall studs shall not be notched, drilled or otherwise damaged so that the undamaged portion of the stud is less than two-thirds the depth of the stud if the stud is *loadbearing* or 40 mm if the stud is non-*loadbearing*, unless the weakened studs are suitably reinforced.

9.23.5.4. Top Plates

(1) Top plates in walls shall not be notched, drilled or otherwise weakened to reduce the undamaged width to less than 50 mm unless the weakened plates are suitably reinforced.

9.23.5.5. Roof Trusses

(1) Roof truss members shall not be notched, drilled or otherwise weakened unless such notching or drilling is allowed for in the design of the truss.

9.23.6. Anchorage

9.23.6.1. Anchorage of Building Frames

(1) *Building* frames shall be anchored to the *foundation* unless a structural analysis of wind and earth pressures shows anchorage is not required.

(2) Except as provided in Article 9.23.6.3., anchorage shall be provided by embedding the ends of the first floor joists in concrete, or fastening the sill plate to the *foundation* with not less than 12.7 mm diam anchor bolts spaced not more than 2 400 mm o.c.

(3) Anchor bolts referred to in Sentence (2) shall be fastened to the sill plate with nuts and washers and shall be embedded not less than 100 mm in the *foundation* and so designed that they may be tightened without withdrawing them from the *foundation*.

9.23.6.2. Anchorage of Columns and Posts

(1) Except as provided in Sentences (2) and (3), exterior columns and posts shall be anchored to resist uplift and lateral movement.

(2) Except as provided in Sentence (3), where columns or posts support balconies, decks, verandas and other exterior platforms, and the columns or posts extend not more than 600 mm above finished ground level, the supported joists or beams shall be,

(a) anchored to a *foundation* to resist uplift and lateral movement, or

(b) directly anchored to the ground to resist uplift.

(3) Anchorage is not required for platforms described in Sentence (2) that,

(a) are not more than 1 storey,

(b) are not more than 55 m² in area,

(c) do not support a roof, and

(d) are not attached to another structure, unless it can be demonstrated that differential movement will not adversely affect the performance of that structure.

9.23.6.3. Anchorage of Smaller Buildings

(1) *Buildings* not more than 4.3 m wide and not more than 1 *storey* in *building height* are permitted to be anchored in conformance with the requirements of CAN/CSA-Z240.10.1, "Site Preparation, Foundation and Anchorage of Mobile Homes".

9.23.7. Sill Plates

9.23.7.1. Size of Sill Plates

(1) Where sill plates provide bearing for the floor system they shall be not less than 38 mm by 89 mm material.

9.23.7.2. Levelling of Sill Plates

(1) Sill plates shall be,

(a) levelled by setting them on a full bed of mortar, or

(b) laid directly on the *foundation* where the top of the *foundation* is level.

(2) The joint between the sill plate for exterior walls and the *foundation* shall be sealed in accordance with Subsection 9.25.3.

9.23.8. Beams to Support Floors

9.23.8.1. Bearing for Beams

(1) Beams shall have even and level bearing and shall have not less than 89 mm length of bearing at end supports, except as required in notes to Tables A-8 to A-11.

9.23.8.2. Priming of Steel Beams

(1) Exterior steel beams susceptible to corrosion shall be shop primed with rust-inhibitive paint.

9.23.8.3. Built-up Wood Beams

(1) Where a beam is made up of individual pieces of lumber that are nailed together, the individual members shall be 38 mm or greater in thickness and installed on edge.

(2) Except as permitted in Sentence (3), where individual members of a built-up beam are butted together to form a joint, the joint shall occur over a support.

(3) Where a beam is continuous over more than 1 span, individual members are permitted to be butted together to form a joint at or within 150 mm of the end quarter points of the clear spans, provided the quarter points are not those closest to the ends of the beam.

(4) Members joined at quarter points shall be continuous over adjacent supports.

(5) Joints in individual members of a beam that are located at or near the end quarter points shall not occur in adjacent members at the same quarter point and shall not reduce the effective beam width by more than half.

(6) Not more than 1 butt joint shall occur in any individual member of a built-up beam within any one span.

(7) Except as provided in Sentence (8), where 38 mm members are laid on edge to form a built-up beam, individual members shall be nailed together with a double row of nails not less than 89 mm in length, spaced not more than 450 mm apart in each row with the end nails located 100 mm to 150 mm from the end of each piece.

(8) Where 38 mm members in built-up wood beams are not nailed together as provided in Sentence (7), they shall be bolted together with not less than 12.7 mm diam bolts equipped with washers and spaced not more than 1 200 mm o.c., with the end bolts located not more than 600 mm from the ends of the members.

9.23.9. Floor Joists

9.23.9.1. End Bearing for Joists

(1) Except when supported on ribbon boards, floor joists shall have not less than 38 mm length of end bearing.

(2) Ribbon boards referred to in Sentence (1) shall be not less than 19 mm by 89 mm lumber let into the studs.

9.23.9.2. Joists Supported by Beams

(1) Floor joists may be supported on the tops of beams or may be framed into the sides of beams.

(2) When framed into the side of a wood beam, joists referred to in Sentence (1) shall be supported on,

(a) joist hangers or other acceptable mechanical connectors, or

(b) not less than 38 mm by 64 mm ledger strips nailed to the side of the beam, except that 38 mm by 38 mm ledger strips may be used provided each joist is nailed to the beam by at least four 89 mm nails, in addition to the nailing for the ledger strip required in Table 9.23.3.4.

(3) When framed into the side of a steel beam, joists referred to in Sentence (1) shall be supported on the bottom flange of the beam or on not less than 38 mm by 38 mm lumber bolted to the web with not less than 6.3 mm diam bolts spaced not more than 600 mm apart.

(4) Joists referred to in Sentence (3) shall be spliced above the beam with not less than 38 mm by 38 mm lumber at least 600 mm long to support the flooring.

(5) Not less than a 12 mm space shall be provided between the splice required in Sentence (4) and the beam to allow for shrinkage of the wood joists.

9.23.9.3. Restraint of Joist Bottoms

(1) Except as provided in Sentence 9.23.9.4.(1), bottoms of floor joists shall be restrained from twisting at each end by toe-nailing to the supports, end-nailing to the header joists or by providing continuous strapping, blocking between the joists or cross-bridging near the supports.

9.23.9.4. Strapping and Bridging in Tables A-1 and A-2

(1) Except as permitted by Sentence (5), where strapping is specified in Table A-1, it shall be,

(a) not less than 19 mm by 64 mm, nailed to the underside of floor joists,

(b) located not more than 2 100 mm from each support or other rows of strapping, and

(c) fastened at each end to a sill or header.

(2) Where bridging is specified in Table A-1, it shall consist of not less than 19 mm by 64 mm or 38 mm by 38 mm cross bridging located not more than 2 100 mm from each support or other rows of bridging.

(3) Where bridging and strapping are specified in Tables A-1,

(a) bridging shall,

  (i) comply with Sentence (2), or

  (ii) consist of 38 mm solid blocking located not more than 2 100 mm from each support or other rows of bridging and securely fastened between the joists, and

(b) except as provided in Sentence (5), strapping shall comply with Sentence (1) and be installed under the bridging.

(4) Bridging specified in Table A-2 shall consist of,

(a) bridging as described in Sentence (2), or

(b) 38 mm solid blocking located not more than 2 100 mm from each support or other rows of bridging and securely fastened between the joists.

(5) Strapping described in Sentence (1) and Clause (3)(b) is not required where,

(a) furring strips complying with Table 9.29.3.1. are fastened directly to the joists, or

(b) a panel-type ceiling finish complying with Subsection 9.29.5., 9.29.6., 9.29.7., 9.29.8., or 9.29.9. is attached directly to the joists.

(6) Where a ceiling attached to wood furring is specified in Table A-2,

(a) the ceiling finish shall consist of gypsum board, plywood or OSB not less than 12.7 mm thick, and

(b) the furring shall be,

  (i) 19 mm by 89 mm wood furring spaced at not more than 600 mm o.c., or

  (ii) 19 mm by 64 mm wood furring spaced at not more than 400 mm o.c.

9.23.9.5. Header Joists

(1) Header joists around floor openings shall be doubled when they exceed 1 200 mm in length.

(2) The size of header joists exceeding 3.2 m in length shall be determined by calculations.

9.23.9.6. Trimmer Joists

(1) Trimmer joists around floor openings shall be doubled when the length of the header joist exceeds 800 mm.

(2) When the header joist exceeds 2 000 mm in length the size of the trimmer joists shall be determined by calculations.

9.23.9.7. Support of Tail and Header Joists

(1) When tail joists and header joists are supported by the floor framing, they shall be supported by suitable joist hangers or nailing in accordance with Table 9.23.3.4.

9.23.9.8. Support of Walls

(1) Non-*loadbearing* walls parallel to the floor joists shall be supported by joists beneath the wall or on blocking between the joists.

(2) Blocking referred to in Sentence (1) for the support of non-*loadbearing* walls shall be not less than 38 mm by 89 mm lumber, spaced not more than 1 200 mm apart.

(3) Non-*loadbearing* interior walls at right angles to the floor joists are not restricted as to location.

(4) *Loadbearing* interior walls parallel to floor joists shall be supported by beams or walls of sufficient strength to transfer safely the design loads to vertical supports.

(5) *Loadbearing* interior walls at right angles to floor joists shall be located not more than 900 mm from the joist support when the wall does not support a floor, and not more than 600 mm from the joist support when the wall supports one or more floors, unless the joist size is designed to support such loads.

9.23.9.9. Cantilevered Floor Joists

(1) Floor joists supporting roof loads shall not be cantilevered more than 400 mm beyond their supports where 38 mm by 184 mm joists are used and not more than 600 mm beyond their supports where 38 mm by 235 mm or larger joists are used.

(2) The cantilevered portions referred to in Sentence (1) shall not support floor loads from other *storeys* unless calculations are provided to show that the design resistances of the cantilevered joists are not exceeded.

(3) Where cantilevered floor joists described in Sentences (1) and (2) are at right angles to the main floor joists, the tail joists in the cantilevered portion shall,

(a) extend inward away from the cantilever support a distance equal to not less than 6 times the length of the cantilever, and

(b) shall be end nailed to an interior doubled header joist in conformance with Table 9.23.3.4.

9.23.10. Wall Studs

9.23.10.1. Stud Size and Spacing

(1) Except as provided in Sentence (2), the size and spacing of studs shall conform to Table 9.23.10.1.

(2) Studs for walls not listed in Table 9.23.10.1. and supporting roof loads shall conform to Table A-30 to A-33, provided,

(a) the studs are clad with not less than 9.5 mm thick plywood, OSB or waferboard sheathing on the exterior face, and not less than 12.5 mm gypsum board on the interior face,

(b) solid bridging is provided at not more than 1 200 mm on centre,

(c) the studs are fastened to the top and bottom plates with no fewer than three 82 mm toe-nails,

(d) the double top plates are fastened together with not less than 76 mm nails spaced not more than 200 mm on centre,

(e) roof framing members spaced not more than 600 mm are fastened to the top plates with no fewer than four 82 mm toe-nails, and

(f) the bottom plate is fastened to the floor joists, blocking or rim joist with not less than 82 mm nails spaced not more than 200 mm on centre.

Table 9.23.10.1.
Size and Spacing of Studs

Forming Part of Sentence 9.23.10.1.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5
Type of Wall	Supported Loads (including *dead loads*)	Minimum Stud Size, mm	Maximum Stud Spacing, mm	Maximum Unsupported Height, m
Interior	No load	38 × 38	400	2.4
		38 × 89 flat(1)	400	3.6
	Attic not accessible by a stairway	38 × 64	600	3.0
		38 × 64 flat(1)	400	2.4
		38 × 89	600	3.6
		38 × 89 flat(1)	400	2.4
	Attic accessible by a stairway plus one floor Roof load plus one floor Attic not accessible by stairway plus 2 floors	38 × 89	400	3.6
	Roof load,			
	Attic accessible by a stairway	38 × 64	400	2.4
	Attic not accessible by a stairway plus one floor	38 × 89	600	3.6
	Attic accessible by a stairway plus 2 floors Roof load plus 2 floors	38 × 89	300	3.6
		64 × 89	400	3.6
		38 × 140	400	4.2
	Attic accessible by a stairway plus 3 floors Roof load plus 3 floors	38 × 140	300	4.2
Exterior	Roof with or without attic storage	38 × 64	400	2.4
		38 × 89	600	3.0
	Roof with or without attic storage plus one floor	38 × 89	400	3.0
		38 × 140	600	3.0
	Roof with or without attic storage plus 2 floors	38 × 89	300	3.0
		64 × 89	400	3.0
		38 × 140	400	3.6
	Roof with or without attic storage plus 3 floors	38 × 140	300	1.8

Notes to Table 9.23.10.1.:

(1) See Article 9.23.10.3.

9.23.10.2. Bracing and Lateral Support

(1) Except as provided in Sentence (2), each exterior wall in each *storey* shall be braced with at least one diagonal brace conforming to Sentence (3).

(2) Bracing is not required where the walls,

(a) have an interior finish conforming to the requirements of Section 9.29., or

(b) where the walls are,

  (i) clad with panel-type siding,

  (ii) diagonally sheathed with lumber, or

  (iii) sheathed with plywood, OSB, waferboard, gypsum or fibreboard sheathing.

(3) Where bracing is required, it shall,

(a) consist of not less than 19 mm by 89 mm wood members,

(b) be applied to the studs at an angle of approximately 45° to the horizontal, and

(c) extend the full height of the wall on each *storey*.

(4) Bracing described in Sentence (3) shall be nailed to each stud and wall plate by at least two 63 mm nails.

(5) Where *loadbearing* interior walls are not finished in accordance with Sentence (2), blocking or strapping shall be fastened to the studs at mid-height to prevent sideways buckling.

9.23.10.3. Orientation of Studs

(1) Except as permitted in Sentences (2) and (3), all studs shall be placed at right angles to the wall face.

(2) Studs on the flat are permitted to be used in gable ends of roofs that contain only unfinished space or in non-*loadbearing* interior walls within the limits described in Article 9.23.10.1.

(3) Wall studs that support only a load from an attic not accessible by a stairway are permitted to be placed on the flat within the limits permitted in Article 9.23.10.1. provided,

(a) the studs are clad on at least 1 side with plywood, OSB or waferboard sheathing fastened to the face of the studs with a structural adhesive, and

(b) the portion of the roof supported by the studs does not exceed 2 100 mm in width.

9.23.10.4. Continuity of Studs

(1) Wall studs shall be continuous for the full *storey* height except at openings and shall not be spliced except by finger-jointing with a structural adhesive.

9.23.10.5. Support for Cladding Materials

(1) Corners and intersections shall be designed to provide adequate support for the vertical edges of interior finishes, sheathing and cladding materials, and in no instance shall exterior corners be framed with less than the equivalent of 2 studs.

(2) Where the vertical edges of interior finishes at wall intersections are supported at vertical intervals by blocking or furring, the vertical distance between such supports shall not exceed the maximum distance between supports specified in Section 9.29.

9.23.10.6. Studs at Sides of Openings

(1) Except as provided in Sentence (2), studs shall be doubled on each side of openings so that the inner studs extend from the lintel to the bottom wall plate and the outer studs extend from the top wall plates to the bottom wall plate.

(2) Single studs are permitted to be used on either side of openings,

(a) in non-*loadbearing* interior walls not required to have *fire-resistance ratings* provided the studs extend from the top wall plate to the bottom wall plate, or

(b) in *loadbearing* or non-*loadbearing* interior or exterior walls, provided,

  (i) the opening is less than and within the required stud spacing, and

  (ii) no two such openings of full stud space width are located in adjacent stud spaces.

9.23.10.7. Stud Posts Built into Walls

(1) Except as provided in Sentences (2) and (3), stud posts shall be designed in accordance with Part 4.

(2) The number of studs in a wall directly below a girder truss or roof beam shall conform to Tables A-34 to A-37, provided,

(a) the studs are fastened together to form a post in accordance with Sentence 9.17.4.2.(2),

(b) the wall is not less than 1 200 mm long and sheathed on at least one side with plywood, OSB, waferboard or gypsum sheathing, and

(c) the wall sheathing is fastened to the stud post with at least one row of fasteners conforming to Article 9.23.3.5. and spaced not less than 150 mm on centre.

(3) The width of the stud post shall be not less than the width of the girder or beam that it supports.

9.23.11. Wall Plates

9.23.11.1. Size of Wall Plates

(1) Except as provided in Sentence (2), wall plates shall be,

(a) not less than 38 mm thick, and

(b) not less than the required width of the wall studs.

(2) In non-*loadbearing* walls and in *loadbearing* walls where the studs are located directly over framing members, the bottom wall plate may be 19 mm thick.

9.23.11.2. Bottom Wall Plates

(1) A bottom wall plate shall be provided in all cases.

(2) The bottom plate in exterior walls shall not project more than one third the plate width over the support.

9.23.11.3. Top Plates

(1) Except as permitted in Sentences (2) to (4), no fewer than 2 top plates shall be provided in *loadbearing* walls.

(2) A single top plate is permitted to be used in a section of a *loadbearing* wall containing a lintel provided the top plate forms a tie across the lintel.

(3) A single top plate is permitted to be used in *loadbearing* walls where the concentrated loads from ceilings, floors and roofs are not more than 50 mm to one side of the supporting studs and in all non-*loadbearing* walls.

(4) The top plates need not be provided in a section of *loadbearing* wall containing a lintel provided the lintel is tied to the adjacent wall section with,

(a) not less than 75 mm by 150 mm by 0.91 mm thick galvanized steel, or

(b) 19 mm by 89 mm by 300 mm wood splice nailed to each wall section with at least three 63 mm nails.

9.23.11.4. Joints in Top Plates

(1) Joints in the top plates of *loadbearing* walls shall be staggered not less than one stud spacing.

(2) The top plates in *loadbearing* walls shall be lapped or otherwise suitably tied at corners and intersecting walls in accordance with Sentence (4).

(3) Joints in single top plates used with *loadbearing* walls shall be tied in accordance with Sentence (4).

(4) Ties referred to in Sentences (2) and (3) shall be the equivalent of not less than 75 mm by 150 mm by 0.91 mm thick galvanized steel nailed to each wall with at least three 63 mm nails.

9.23.12. Framing Over Openings

9.23.12.1. Openings in Non-Loadbearing Walls

(1) Except as provided in Sentence (2), openings in non-*loadbearing* walls shall be framed with not less than 38 mm material the same width as the studs securely nailed to adjacent studs.

(2) Openings for doors in *non-loadbearing* walls required to be *fire separations* with a *fire-resistance rating* shall be framed with the equivalent of at least two 38 mm thick members that are the same width as the wall plates.

9.23.12.2. Openings in Loadbearing Walls

(1) Openings in *loadbearing* walls greater than the required stud spacing shall be framed with lintels designed to carry the superimposed loads to adjacent studs.

(2) Except as provided in Sentence 9.23.12.3.(2), where 2 or more members are used in lintels, they shall be fastened together with not less than 82 mm nails in a double row, with nails not more than 450 mm apart in each row.

(3) Lintel members may be separated by filler pieces.

9.23.12.3. Lintel Spans and Sizes

(1) Spans and sizes of wood lintels shall conform to the spans shown in Tables A-12 to A-16,

(a) for *buildings* of *residential occupancy*,

(b) where the wall studs exceed 38 mm by 64 mm in size,

(c) where the spans of supported joists do not exceed 4.9 m, and

(d) where the spans of trusses do not exceed 9.8 m.

(2) In *loadbearing* exterior and interior walls of 38 by 64 mm framing members, lintels shall consist of,

(a) solid 64 mm thick members on edge, or

(b) 38 mm thick and 19 mm thick members fastened together with a double row of nails not less than 63 mm long and spaced not more than 450 mm apart.

(3) Lintels referred to in Sentence (2),

(a) shall be not less than 50 mm greater in depth than those shown in Tables A-12 to A-16 for the maximum spans shown, and

(b) shall not exceed 2 240 mm in length.

9.23.13. Roof and Ceiling Framing

9.23.13.1. Continuity of Rafters and Joists

(1) Roof rafters and joists and ceiling joists shall be continuous or shall be spliced over vertical supports that extend to suitable bearing.

9.23.13.2. Framing around Openings

(1) Roof and ceiling framing members shall be doubled on each side of openings greater than 2 rafter or joist spacings wide.

9.23.13.3. End Bearing Length

(1) The length of end bearing of joists and rafters shall be not less than 38 mm.

9.23.13.4. Location and Attachment of Rafters

(1) Rafters shall be located directly opposite each other and tied together at the peak, or may be offset by their own thickness if nailed to a ridge board not less than 17.5 mm thick.

(2) Except as permitted in Sentence (3), framing members shall be connected by gusset plates or nailing at the peak in conformance with Table 9.23.3.4.

(3) Where the roof framing on opposite sides of the peak is assembled separately, such as in the case of factory-built houses, the roof framing on opposite sides is permitted to be fastened together with galvanized-steel strips not less than 200 mm by 75 mm by 0.41 mm thick spaced not more than 1 200 mm apart and nailed at each end to the framing by at least two 63 mm nails.

9.23.13.5. Shaping of Rafters

(1) Rafters shall be shaped at supports to provide even bearing surfaces and supported directly above the exterior walls.

9.23.13.6. Hip and Valley Rafters

(1) Hip and valley rafters shall be not less than 50 mm greater in depth than the common rafters and not less than 38 mm thick, actual dimension.

9.23.13.7. Intermediate Support for Rafters and Joists

(1) Ceiling joists and collar ties of not less than 38 mm by 89 mm lumber are permitted to be assumed to provide intermediate support to reduce the span for rafters and joists where the roof slope is 1 in 3 or greater.

(2) Collar ties referred to in Sentence (1) more than 2 400 mm long shall be laterally supported near their centres by not less than 19 mm by 89 mm continuous members at right angles to the collar ties.

(3) Dwarf walls and struts may be used to provide intermediate support to reduce the span for rafters and joists.

(4) When struts are used to provide intermediate support they shall be not less than 38 mm by 89 mm material extending from each rafter to a *loadbearing* wall at an angle of not less than 45° to the horizontal.

(5) When dwarf walls are used for rafter support, they shall be framed in the same manner as *loadbearing* walls and securely fastened top and bottom to the roof and ceiling framing to prevent over-all movement.

(6) Solid blocking shall be installed between floor joists beneath dwarf walls referred to in Sentence (5) that enclose finished rooms.

9.23.13.8. Ridge Support

(1) Except as provided in Sentence (4), roof rafters and joists shall be supported at the ridge of the roof by,

(a) a *loadbearing* wall extending from the ridge to suitable bearing, or

(b) a ridge beam supported by not less than 89 mm length of bearing.

(2) Except as provided in Sentence (3), the ridge beam referred to in Sentence (1) shall conform to the sizes and spans shown in Table A-12, provided,

(a) the supported rafter or joist length does not exceed 4.9 m, and

(b) the roof does not support any concentrated loads.

(3) The ridge beam referred to in Sentence (1) need not comply with Sentence (2) where,

(a) the beam is of not less than 38 mm by 140 mm material, and

(b) the beam is supported at intervals not exceeding 1 200 mm by not less than 38 mm by 89 mm members extending vertically from the ridge to suitable bearing.

(4) When the roof slope is 1 in 3 or more, ridge support need not be provided when the lower ends of the rafters are adequately tied to prevent outward movement.

(5) Ties required in Sentence (4) are permitted to consist of tie rods or ceiling joists forming a continuous tie for opposing rafters and nailed in accordance with Table 9.23.13.8.

(6) Ceiling joists referred to in Sentence (5) shall be fastened together with at least one more nail per joist splice than required for the rafter to joist connection shown in Table 9.23.13.8.

(7) Members referred to in Sentence (6) are permitted to be fastened together either directly or through a gusset plate.

Table 9.23.13.8.
Rafter-to-Joist Nailing (Unsupported Ridge)

Forming Part of Sentences 9.23.13.8.(5) and (6)

COL. 1	COL. 2	COL. 3	COL. 4	COL. 5	COL. 6	COL. 7	COL. 8	COL. 9	COL. 10	COL. 11	COL. 12	COL. 13	COL. 14
Roof Slope	Rafter Spacing, mm	Minimum Number of Nails not less than 75 mm Long											
		Rafter Tied to every Joist						Rafter Tied to Joist every 1.2 m					
		Building Width up to 8.0 m			*Building* width up to 9.8 m			*Building* Width up to 8.0 m			*Building* Width up to 9.8 m		
		Roof Snow Load, kPa			Roof Snow Load, kPa			Roof Snow Load, kPa			Roof Snow Load, kPa		
		1.0 or less	1.5	2.0 or more	1.0 or less	1.5	2.0 or more	1.0 or less	1.5	2.0 or more	1.0 or less	1.5	2.0 or more
1 in 3	400	4	5	6	5	7	8	11	—	—	—	—	—
	600	6	8	9	8	—	—	11	—	—	—	—	—
1 in 2.4	400	4	4	5	5	6	7	7	10	—	9	—	—
	600	5	7	8	7	9	11	7	10	—	—	—	—
1 in 2	400	4	4	4	4	4	5	6	8	9	8	—	—
	600	4	5	6	5	7	8	6	8	9	8	—	—
1 in 1.71	400	4	4	4	4	4	4	5	7	8	7	9	11
	600	4	4	5	5	6	7	5	7	8	7	9	11
1 in 1.33	400	4	4	4	4	4	4	4	5	6	5	6	7
	600	4	4	4	4	4	5	4	5	6	5	6	7
1 in 1	400	4	4	4	4	4	4	4	4	4	4	4	5
	600	4	4	4	4	4	4	4	4	4	4	4	5

9.23.13.9. Restraint of Joist Bottoms

(1) Roof joists supporting a finished ceiling, other than plywood, OSB or waferboard, shall be restrained from twisting along the bottom edges by means of furring, blocking, cross bridging or strapping conforming to Article 9.23.9.3.

9.23.13.10. Ceiling Joists Supporting Roof Load

(1) Except as permitted in Sentence (2), ceiling joists supporting part of the roof load from the rafters shall be not less than 25 mm greater in depth than required for ceiling joists not supporting part of the roof load.

(2) When the roof slope is 1 in 4 or less, the ceiling joist sizes referred to in Sentence (1) shall be determined from the span tables for roof joists.

9.23.13.11. Wood Roof Trusses

(1) Roof trusses that are not designed in accordance with Part 4 shall,

(a) be capable of supporting a total ceiling load (*dead load* plus *live load*) of 0.35 kPa plus two and two-thirds times the specified live roof load for 24 h, and

(b) not exceed the deflections shown in Table 9.23.13.11. when loaded with the ceiling load plus one and one-third times the specified roof snow load for 1 h.

Table 9.23.13.11.
Maximum Roof Truss Deflections

Forming Part of Sentence 9.23.13.11.(1)

COLUMN 1	COLUMN 2	COLUMN 3
Truss Span	Type of Ceiling	Maximum Deflection
4.3 m or less	Plaster or gypsum board	1/360 of the span
	Other than plaster or gypsum board	1/180 of the span
Over 4.3 m	Plaster or gypsum board	1/360 of the span
	Other than plaster or gypsum board	1/240 of the span

(2) The joint connections used in trusses described in Sentence (1) shall be designed in conformance with the requirements in Subsection 4.3.1.

(3) Where the length of compression web members in roof trusses described in Sentence (1) exceeds 1 830 mm, such web members shall be provided with continuous bracing to prevent buckling.

(4) Bracing required in Sentence (3) shall consist of not less than 19 mm by 89 mm lumber nailed at right angles to the web members near their centres with at least two 63 mm nails for each member.

(5) Where the ability of a truss design to satisfy the requirements of Sentence (1) is demonstrated by testing, it shall consist of a full scale load test carried out in conformance with CSA S307-M, "Load Test Procedure for Wood Trusses for Houses and Small Buildings".

(6) Where the ability of a truss design to satisfy the requirements of Sentence (1) is demonstrated by analysis, it shall be carried out in accordance with good engineering practice such as described in TPIC, "Truss Design Procedures and Specifications for Light Metal Plate Connected Wood Trusses".

9.23.14. Subflooring

9.23.14.1. Subflooring Required

(1) Subflooring shall be provided beneath finish flooring where the finish flooring does not have adequate strength to support the design loads.

9.23.14.2. Material Standards

(1) Except as provided in Sentence (2), wood-based panels for subfloors shall conform to,

(a) CSA O121-M, "Douglas Fir Plywood",

(b) CSA O151, "Canadian Softwood Plywood",

(c) CSA O153-M, "Poplar Plywood",

(d) CAN/CSA-O325.0, "Construction Sheathing", or

(e) CSA O437.0, "OSB and Waferboard".

(2) Particleboard subflooring may be used only where a *building* is constructed in a factory so that the subfloor will not be exposed to the weather.

(3) Subflooring described in Sentence (2) shall conform to grade D-2 or D-3 in ANSI A208.1, "Particleboard, Mat-Formed Wood".

(4) Subflooring described in Sentence (2) shall have its upper surface and all edges treated to restrict water absorption where the subfloor is used in bathrooms, kitchens, laundry rooms or other areas subject to periodic wetting.

9.23.14.3. Edge Support

(1) Where the edges of panel-type subflooring are required to be supported, such support shall consist of tongue-and-groove panel edges or not less than 38 mm by 38 mm blocking securely nailed between framing members.

9.23.14.4. Direction of Installation

(1) Plywood subflooring shall be installed with the surface grain at right angles to the joists and with joints parallel to floor joists staggered.

(2) OSB subflooring conforming to CAN/CSA-O325.0, "Construction Sheathing", or to O-1 and O-2 grades in CSA O437.0, "OSB and Waferboard", and waferboard subflooring conforming to R-1 grade in CSA O437.0 shall be installed with the direction of face orientation at right angles to the joists and the joints parallel to the floor joists are staggered.

9.23.14.5. Subfloor Thickness or Rating

(1) Except as provided in Sentences (2) and (3), subfloors shall conform to Table 9.23.14.5.A. or Table 9.23.14.5.B.

Table 9.23.14.5.A.
Thickness of Subflooring

Forming Part of Sentences 9.23.14.5.(1) and 9.23.15.7.(1)

Column 1	Column 2	Column 3	Column 4	Column 5
Maximum Spacing of Supports, mm	Minimum Thickness, mm			
	Plywood and OSB, O-2 Grade	OSB, O-1 Grade, and Waferboard, R-1 Grade	Particleboard	Lumber
400	15.5	15.9	15.9	17.0
500	15.5	15.9	19.0	19.0
600	18.5	19.0	25.4	19.0

Table 9.23.14.5.B.
Rating for Subfloor when Applying CAN/CSA-O325.0

Forming Part of Sentences 9.23.14.5.(1) and 9.23.15.7.(1)

Column 1	Column 2	Column 3
Maximum Spacing of Supports, mm	Panel Mark	
	Subfloor	Used with Panel-Type Underlay
400	1F16	2F16
500	1F20	2F20
600	1F24	2F24

(2) Where the finished flooring consists of not less than 19 mm matched wood strip flooring laid at right angles to joists, spaced not more than 600 mm o.c., subflooring shall be permitted to consist of not less than,

(a) 12.5 mm thick plywood,

(b) 12.5 mm thick OSB conforming to O-2 grade,

(c) 12.7 mm thick OSB conforming to O-1 grade,

(d) 12.7 mm thick waferboard conforming to R-1 grade, or

(e) OSB conforming to 2R32 / 2F16 grade.

(3) Except where the flooring consists of ceramic tiles applied with adhesive, where a separate panel-type underlay or concrete topping is applied to a subfloor on joists spaced not more than 400 mm o.c., the subfloor may consist of not less than,

(a) 12.5 mm thick plywood,

(b) 12.5 mm thick OSB conforming to O-2 grade,

(c) 12.7 mm thick OSB conforming to O-1 grade,

(d) 12.7 mm thick waferboard conforming to R-1 grade, or

(e) OSB conforming to 2R32 / 2F16 grade.

9.23.14.6. Annular Grooved Nails

(1) When resilient flooring is applied directly to an OSB, waferboard, particleboard or plywood subfloor, the subfloor shall be fastened to the supports with annular grooved nails.

9.23.14.7. Lumber Subflooring

(1) Lumber subflooring shall be laid at an angle of not less than 45° to the joists.

(2) Lumber subflooring shall be fully supported at the ends on solid bearing.

(3) Lumber for subflooring shall be of uniform thickness and not more than 184 mm wide.

9.23.15. Roof Sheathing

9.23.15.1. Required Roof Sheathing

(1) Except as provided in Section 9.26., continuous lumber or panel-type roof sheathing shall be installed to support the roofing.

9.23.15.2. Material Standards

(1) Wood-based panels used for roof sheathing shall conform to the requirements of,

(a) CSA O121-M, "Douglas Fir Plywood",

(b) CSA O151, "Canadian Softwood Plywood",

(c) CSA O153-M, "Poplar Plywood",

(d) CAN/CSA-O325.0, "Construction Sheathing", or

(e) CSA O437.0, "OSB and Waferboard".

9.23.15.3. Direction of Installation

(1) Plywood roof sheathing shall be installed with the surface grain at right angles to the roof framing.

(2) OSB roof sheathing conforming to CAN/CSA-O325.0, "Construction Sheathing", or to O-1 and O-2 grades as specified in CSA O437.0, "OSB and Waferboard", shall be installed with the direction of face orientation at right angles to the roof framing members.

9.23.15.4. Joints in Panel-Type Sheathing

(1) Panel-type sheathing board shall be applied so that joints perpendicular to the roof ridge are staggered where,

(a) the sheathing is applied with the surface grain parallel to the roof ridge, and

(b) the thickness of the sheathing is such that the edges are required to be supported.

(2) A gap of not less than 2 mm shall be left between sheets of plywood, OSB or waferboard.

9.23.15.5. Lumber Roof Sheathing

(1) Lumber roof sheathing shall not be more than 286 mm wide and shall be applied so that all ends are supported with end joints staggered.

9.23.15.6. Edge Support

(1) Except as permitted in Sentence (2), where panel-type roof sheathing requires edge support, the support shall consist of,

(a) metal H clips, or

(b) not less than 38 mm by 38 mm blocking securely nailed between framing members.

(2) The supports referred to in Sentence (1) are not required when tongued-and-grooved edged panel-type sheathing board is used.

9.23.15.7. Thickness or Rating

(1) The thickness or rating of roof sheathing on a flat roof used as a walking deck shall conform to either Table 9.23.14.5.A. or Table 9.23.14.5.B. for subfloors.

Table 9.23.15.7.A.
Thickness of Roof Sheathing

Forming Part of Sentence 9.23.15.7.(2)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6
Maximum Spacing of Supports, mm	Minimum Thickness, mm				
	Plywood and OSB, O-2 Grade		OSB, O-1 Grade and Waferboard, R-1 Grade		Lumber
	Edges Supported	Edges Unsupported	Edges Supported	Edges Unsupported	
300	7.5	7.5	9.5	9.5	17.0
400	7.5	9.5	9.5	11.1	17.0
600	9.5	12.5	11.1	12.7	19.0

Table 9.23.15.7.B.
Rating for Roof Sheathing When Applying CAN/CSA-O325.0

Forming Part of Sentence 9.23.15.7.(2)

COLUMN 1	COLUMN 2	COLUMN 3
Maximum Spacing of Supports, mm	Panel Mark	
	Edges Supported	Edges Unsupported
400	2R16	1R16
500	2R20	1R20
600	2R24	1R24

(2) The thickness or rating of roof sheathing on a roof not used as a walking deck shall conform to either Table 9.23.15.7.A. or Table 9.23.16.7.B.

(3) Asphalt-coated or asphalt-impregnated fibreboard not less than 11.1 mm thick conforming to CAN/ULC-S706, "Wood Fibre Thermal Insulation for Buildings", is permitted to be used as a roof sheathing over supports spaced not more than 400 mm o.c. provided the roofing consists of,

(a) a continuous sheet of galvanized steel not less than 0.33 mm in thickness, or

(b) a continuous sheet of aluminum not less than 0.61 mm in thickness.

(4) All edges of sheathing described in Sentence (3) shall be supported by blocking or framing.

9.23.16. Wall Sheathing

9.23.16.1. Required Sheathing

(1) Exterior walls and gable ends shall be sheathed when the *exterior cladding* requires intermediate fastening between supports or if the *exterior cladding* requires solid backing.

9.23.16.2. Thickness, Rating and Material Standards

(1) Where wall sheathing is required, it shall conform to Table 9.23.16.2.A. or Table 9.23.16.2.B.

Table 9.23.16.2.A.
Wall Sheathing Thickness and Specifications

Forming Part of Sentence 9.23.16.2.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
Type of Sheathing	Minimum Thickness, mm(1)		Material Standards
	With Supports 400 mm o.c.	With Supports 600 mm o.c.	
Fibreboard (insulating)	9.5	11.1	CAN/ULC-S706
Gypsum Sheathing	9.5	12.7	CAN/CSA-A82.27-M ASTM C79 / C79M ASTM C1177 / C1177M ASTM C1396 / C1396M
Lumber	17.0	17.0	See Table 9.3.2.1.
Mineral Fibre, Rigid Board, Type 2	25	25	CAN/ULC-S702
OSB, O-2 Grade	6.0	7.5	CSA O437.0
OSB, O-1 Grade, and Waferboard, R-1 Grade	6.35	7.9	CSA O437.0
Phenolic, faced	25	25	CAN/CGSB-51.25-M

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
Type of Sheathing	Minimum Thickness, mm(1)		Material Standards
	With Supports 400 mm o.c.	With Supports 600 mm o.c.	
Plywood (exterior type)	6	7.5	CSA O121-M
			CSA O151
			CSA O153-M
Polystyrene, Types 1 and 2	38	38	CAN/ULC-S701
Polystyrene, Types 3 and 4	25	25	CAN/ULC-S701
Polyurethane and Polyisocycanurate Type 1, faced	38	38	CAN/ULC-S704
Polyurethane and Polyisocycanurate Types 2 and 3, faced	25	25	CAN/ULC-S704

Notes to Table 9.23.16.2.A.:

(1) See also Sentences 9.27.5.1.(2) to (4).

Table 9.23.16.2.B.
Rating For Wall Sheathing When Applying CAN/CSA-O325.0

Forming Part of Sentence 9.23.16.2.(1)

COLUMN 1	COLUMN 2
Maximum Spacing of Supports, mm	Panel Mark
400	W16
500	W20
600	W24

9.23.16.3. Attachment of Cladding to Sheathing

(1) Gypsum sheathing, rigid insulation and fibreboard shall not be used for the attachment of siding materials.

(2) Nails used in attaching the materials listed in Sentence (1) shall be not less than 3.2 mm diam with a minimum head diameter of 11 mm.

9.23.16.4. Lumber Sheathing

(1) Lumber wall sheathing shall be applied so that all ends are supported.

(2) Where lumber wall sheathing is required to provide bracing according to Article 9.23.10.2., it shall be applied with end joints staggered.

9.23.16.5. Joints in Panel-Type Sheathing

(1) A gap of not less than 2 mm shall be left between sheets of plywood, OSB, waferboard or fibreboard.

9.23.16.6. Mansard Style Roofs

(1) Where the bottom portions of mansard style roofs are vented, the vertical framing members behind the sloping portions shall be considered on the same basis as exterior wall studs and shall conform to the appropriate requirements in Subsection 9.23.17.

Section 9.24. Sheet Steel Stud Wall Framing

9.24.1. General

9.24.1.1. Application

(1) This Section applies to sheet steel studs for use in non-*loadbearing* exterior and interior walls.

(2) Where *loadbearing* steel studs are used, they shall be designed in conformance with Part 4.

9.24.1.2. Material Standards

(1) Steel studs and runners shall conform to CAN/CGSB-7.1, "Lightweight Steel Framing Components".

9.24.1.3. Metal Thickness

(1) Metal thickness specified in this Section shall be the minimum base steel thickness exclusive of coatings.

9.24.1.4. Screws

(1) Screws for the application of cladding, sheathing or interior finish materials to steel studs, runners and furring channels shall conform to ASTM C1002, "Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs".

9.24.1.5. Cladding, Sheathing and Interior Finish Required

(1) Cladding or sheathing, and interior finish shall be installed on steel stud framing and shall be fastened with screws,

(a) spaced at the appropriate spacing described in Section 9.29., and

(b) penetrating not less than 10 mm through the metal.

9.24.2. Size of Framing

9.24.2.1. Size and Spacing of Studs in Interior Walls

(1) Except as required in Articles 9.24.2.3. and 9.24.2.4., the size and spacing of steel studs for non-*loadbearing* interior walls shall conform to Table 9.24.2.1.

Table 9.24.2.1.
Steel Studs for Non-Loadbearing Interior Walls

Forming Part of Sentence 9.24.2.1.(1)

COLUMN 1	COLUMN 2	COLUMN 3
Minimum Stud Size, mm	Maximum Stud Spacing, mm	Maximum Wall Height, m
30 × 40	400	3.0
	600	2.7
30 × 63	400	4.0
	600	3.6
30 × 91	400	5.2
	600	4.9

9.24.2.2. Thickness of Studs

(1) Except as required in Article 9.24.2.4., steel studs in non-*loadbearing* interior walls shall have a metal thickness of not less than 0.46 mm.

9.24.2.3. Runners

(1) Runners for interior and exterior non-*loadbearing* walls shall have a thickness of not less than the thickness of the corresponding studs and shall have not less than 30 mm flanges.

9.24.2.4. Openings in Fire Separations

(1) Where openings for doors in non-*loadbearing fire separations* required to have a *fire-resistance rating* do not exceed 1 200 mm in width,

(a) the width of steel studs shall be not less than 63 mm, and

(b) the steel thickness shall be not less than 0.46 mm.

(2) Where openings described in Sentence (1) exceed 1 200 mm in width,

(a) the width of steel studs shall be not less than 91 mm, and

(b) the metal thickness shall be not less than 0.85 mm.

(3) The distance to the first stud beyond the jamb of any door opening in a *fire separation* required to have a *fire-resistance rating* shall not exceed 400 mm.

(4) Where the distance between the framing over the opening referred to in Sentence (3) and the top runner exceeds 400 mm in such walls, intermediate support shall be installed at intervals of not more than 400 mm above the opening.

9.24.2.5. Size and Spacing of Studs in Exterior Walls

(1) The size and spacing of non-*loadbearing* steel studs for exterior walls shall conform to Table 9.24.2.5.

Table 9.24.2.5.
Size and Spacing of Steel Studs for Non-Loadbearing Exterior Walls

Forming Part of Sentence 9.24.2.5.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5
Minimum Stud Size, mm	Minimum Metal Thickness, mm	Maximum Stud Length, m		
		Spacing of Studs		
		300 mm (o.c.)	400 mm (o.c.)	600 mm (o.c.)
30 × 91	0.53	3.0	2.4	—
30 × 91	0.69	3.3	2.7	2.4

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5
Minimum Stud Size, mm	Minimum Metal Thickness, mm	Maximum Stud Length, m		
		Spacing of Studs		
		300 mm (o.c.)	400 mm (o.c.)	600 mm (o.c.)
30 × 91	0.85	3.6	3.0	2.7
30 × 91	1.0	4.0	3.3	3.0

9.24.3. Installation

9.24.3.1. Installation of Runners

(1) Runners shall be provided at the tops and bottoms of walls.

(2) Runners required in Sentence (1) shall be securely attached to the *building* at approximately 50 mm from the ends, and at intervals of not more than 600 mm o.c. for interior walls and 300 mm o.c. for exterior walls.

(3) Fasteners used for attachment described in Sentence (2) shall consist of the equivalent of 63 mm nails or 25 mm screws.

(4) Studs at openings and that are not full wall height shall be supported by a runner at the ends of the studs, securely fastened to the full length studs at the sides of the opening.

9.24.3.2. Fire-Rated Walls

(1) Steel studs used in walls required to have a *fire-resistance rating* shall be installed so that there is not less than a 12 mm clearance between the top of the stud and the top of the runner to allow for expansion in the event of fire.

(2) Except as provided in Article 9.24.3.6., studs in walls referred to in Sentence (1) shall not be attached to the runners in a manner that will prevent such expansion.

(3) Framing above doors with steel door frames in non-*loadbearing fire separations* required to have a *fire-resistance rating* shall consist of 2 runners on the flat fastened back to back.

(4) The lower runner required in Sentence (3) shall be cut through the flanges and be bent at each end to extend upwards at least 150 mm and fastened to the adjacent studs.

9.24.3.3. Orientation of Studs

(1) Steel studs shall be installed with webs at right angles to the wall face and, except at openings, shall be continuous for the full wall height.

9.24.3.4. Support for Cladding Materials

(1) Corners and intersections of walls shall be constructed to provide support for the cladding materials.

9.24.3.5. Framing around Openings

(1) Studs shall be doubled on each side of every opening where such openings involve more than 1 stud space, and shall be tripled where the openings in exterior walls exceed 2 400 mm in width.

(2) Studs described in Sentence (1) shall be fastened together by screws, crimping or welding to act as a single structural unit in resisting transverse loads.

9.24.3.6. Attachment of Studs to Runners

(1) Studs shall be attached to runners by screws, crimping or welding around wall openings, and elsewhere where necessary to keep the studs in alignment during construction.

(2) Where clearance for expansion is required in Article 9.24.3.2., attachment required in Sentence (1) shall be applied between studs and bottom runners only.

9.24.3.7. Openings for Fire Dampers

(1) Openings for *fire dampers* in non-*loadbearing fire separations* required to have a *fire-resistance rating* shall be framed with double studs on each side of the opening.

(2) The sill and header for openings described in Sentence (1) shall consist of a runner track with right angle bends made on each end so as to extend 300 mm above the header or below the sill and fastened to the studs.

(3) The openings described in Sentence (1) shall be lined with a layer of gypsum board at least 12.7 mm thick fastened to stud and runner webs.

Section 9.25. Heat Transfer, Air Leakage and Condensation Control

9.25.1. Scope

9.25.1.1. Application

(1) This Section applies to the application of thermal insulation and measures to control condensation, heat transfer and air leakage for *buildings* of *residential occupancy* intended for use on a continuing basis during the winter months.

(2) Insulation and sealing of heating and ventilating ducts shall conform to Sections 9.32. and 9.33.

9.25.1.2. General

(1) Sheet and panel-type materials shall be installed in accordance with Sentence (2), if the material,

(a) has an air leakage characteristic less than 0.1 L/(s·m^2) at 75 Pa,

(b) has a water vapour permeance less than 60 ng/(Pa·s·m^2) when measured in accordance with ASTM E96, "Water Vapor Transmission of Materials", using the desiccant method (dry cup), and

(c) is incorporated into a *building* assembly required by Article 9.25.2.1. to be insulated.

(2) Sheet and panel-type material described in Sentence (1) shall be installed,

(a) on the warm face of the assembly,

(b) except as provided in Sentences (3) to (5), at a location where the ratio between the total thermal resistance of all materials outboard of its innermost impermeable surface and the total thermal resistance of all materials inboard of that surface is not less than that required in Table 9.25.1.2., or

(c) outboard of an air space that is vented to the outdoors and, for walls, drained.

Table 9.25.1.2.
Ratio of Outboard to Inboard Thermal Resistance

Forming Part of Sentence 9.25.1.2.(1)

COLUMN 1	COLUMN 2
Heating Degree Days of *Building* Location[1], Celsius Degree-days	Minimum Ratio, Total Thermal Resistance Outboard of Material's Inner Surface to Total Thermal Resistance Inboard of Material's Inner Surface
up to 4 999	0.20
5 000 to 5 999	0.30
6 000 to 6 999	0.35
7 000 to 7 999	0.40
8 000 to 8 999	0.50
9 000 to 9 999	0.55
10 000 to 10 999	0.60
11 000 to 11 999	0.65
12 000 to 12 999	0.75

Notes to Table 9.25.1.2.:

(1) See Supplementary Standard SB-1.

(3) Wood-based sheathing materials not more than 12.5 mm thick and complying with Article 9.23.16.2. need not comply with Sentence (1).

(4) Where the mild climate indicator, determined in accordance with Sentence (6), is greater than 6300, the position of low air- and vapour-permeance materials within the assembly relative to the position of materials providing thermal resistance shall be determined according to Part 5 where,

(a) the intended use of the interior space requires the indoor relative humidity to be maintained above 35% over the heating season and the ventilating and *air-conditioning* system is designed to maintain that relative humidity, or

(b) the intended use of the interior space will result in an indoor relative humidity above 35% over the heating season and the ventilating and *air-conditioning* system does not have the capacity to reduce the relative humidity to 35% for any period over that period.

(5) Where the mild climate indicator, determined in accordance with Sentence (6), is less than or equal to 6300, the position of low air- and vapour-permeance materials within the assembly relative to the position of materials providing thermal resistance shall be determined according to Part 5 where,

(a) the intended use of the interior space requires the indoor relative humidity to be maintained above 60% over the heating season and the ventilation and *air-conditioning* system is designed to maintain that relative humidity, or

(b) the intended use of the interior space will result in an indoor relative humidity above 60% over the heating season and the ventilating and *air-conditioning* system does not have the capacity to reduce the relative humidity above 60% for any period over that period.

(6) The mild climate indicator (MCI) shall be calculated according to the following formula:

$$MCI = abs(2.5\%\ JMT) \cdot 200 + DD$$

where,

abs(2.5% JMT) = absolute value of 2.5% January mean temperature, and

DD = degree-days

(7) For walls, the air space described in Clause (2)(c) shall comply with Clause 9.27.2.2.(1)(a).

9.25.2. Thermal Insulation

9.25.2.1. Required Insulation

(1) All walls, ceilings and floors separating heated space from unheated space, the exterior air or the exterior *soil* shall be provided with thermal insulation in conformance with Sections 12.2. and 12.3. to prevent moisture condensation on their room side during the winter and to ensure comfortable conditions for the occupants.

9.25.2.2. Insulation Materials

(1) Except as required in Sentence (2), thermal insulation shall conform to the requirements of,

(a) CAN/CGSB-51.25-M, "Thermal Insulation, Phenolic, Faced",

(b) CAN/CGSB-51-GP-27M, "Thermal Insulation, Polystyrene, Loose Fill",

(c) CAN/ULC-S701, "Thermal Insulation, Polystyrene, Boards and Pipe Covering",

(d) CAN/ULC-S702 "Mineral Fibre Thermal Insulation for Buildings",

(e) CAN/ULC-S703, "Cellulose Fibre Insulation (CFI) for Buildings",

(f) CAN/ULC-S704, "Thermal Insulation, Polyurethane and Polyisocyanurate, Boards, Faced",

(g) CAN/ULC-S705.1, "Thermal Insulation – Spray Applied Rigid Polyurethane Foam, Medium Density – Material Specification", or

(h) CAN/ULC-S706, "Wood Fibre Thermal Insulation for Buildings".

(2) The *flame-spread rating* requirements contained in the standards listed in Sentence (1) shall not apply.

(3) Insulation in contact with the ground shall be inert to the action of *soil* and water and be such that its insulative properties are not significantly reduced by moisture.

(4) Type 1 expanded polystyrene insulation as described in CAN/ULC-S701, "Thermal Insulation, Polystyrene, Boards and Pipe Covering", shall not be used as roof insulation applied above the roofing membrane.

9.25.2.3. Installation of Thermal Insulation

(1) Insulation shall be installed so that there is a reasonably uniform insulating value over the entire face of the insulated area.

(2) Insulation shall be applied to the full width and length of the space between furring or framing.

(3) Except where the insulation provides the principal resistance to air leakage, thermal insulation shall be installed so that at least 1 face is in full and continuous contact with an element with low air permeance.

(4) Insulation on the interior of *foundation* walls enclosing a crawl space shall be applied so that there is not less than a 50 mm clearance above the crawl space floor if the insulation is of a type that may be damaged by water.

(5) Insulation around concrete slabs-on-ground shall be located so that heat from the *building* is not restricted from reaching the ground beneath the perimeter, where exterior walls are not supported by footings extending below frost level.

(6) Where insulation is exposed to the weather and subject to mechanical damage, it shall be protected with not less than,

(a) 6 mm asbestos-cement board,

(b) 6 mm preservative-treated plywood, or

(c) 12 mm cement parging on wire lath applied to the exposed face and edge.

(7) Except as permitted in Sentence (8) insulation and *vapour barrier* shall be protected from mechanical damage by a covering such as gypsum board, plywood, particleboard, OSB, waferboard or hardboard.

(8) In unfinished *basements*, the protection required in Sentence (7) need not be provided for mineral fibre insulation provided it is covered with polyethylene *vapour barrier* of at least 0.15 mm in thickness.

(9) Insulation in factory-built *buildings* shall be installed so that it will not become dislodged during transportation.

9.25.2.4. Installation of Loose-Fill Insulation

(1) Except as provided in Sentences (2) to (5), loose-fill insulation shall be used on horizontal surfaces only.

(2) Where loose-fill insulation is installed in an unconfined sloped space, such as an attic space over a sloped ceiling, the supporting slope shall not be more than,

(a) 4.5 in 12 for mineral fibre or cellulose fibre insulation, and

(b) 2.5 in 12 for other types of insulation.

(3) Loose-fill insulation may be used in wood-frame walls of existing *buildings*.

(4) Where blown-in insulation is installed in above-ground or below-ground wood frame walls of new *buildings*,

(a) the density of the installed insulation shall be sufficient to preclude settlement,

(b) the insulation shall be installed behind a membrane that will permit visual inspection prior to installation of the interior finish,

(c) the insulation shall be installed in a manner that will not interfere with the installation of the interior finish, and

(d) no water shall be added to the insulation, unless it can be shown that the added water will not adversely affect other materials in the assembly.

(5) Water repellent loose-fill insulation may be used between the outer and inner wythes of masonry *cavity walls*.

(6) Where soffit venting is used, measures shall be taken,

(a) to prevent loose-fill insulation from blocking the soffit vents and to maintain an open path for circulation of air from the vents into the *attic or roof space*, and

(b) to minimize air flow into the loose-fill insulation near the soffit vents to maintain the thermal performance of the material.

9.25.2.5. Installation of Spray-applied Polyurethane

(1) Spray-applied polyurethane insulation shall be installed in accordance with CAN/ULC-S705.2, "Thermal Insulation – Spray-Applied Rigid Polyurethane Foam, Medium Density, Installer's Responsibilities – Specification".

9.25.3. Air Barrier Systems

9.25.3.1. Required Barrier to Air Leakage

(1) Thermally insulated wall, ceiling and floor assemblies shall be constructed so as to include an *air barrier system* that will provide a continuous barrier to air leakage,

(a) from the interior of the *building* into wall, floor, *attic or roof spaces* sufficient to prevent excessive moisture condensation in such spaces during the winter, and

(b) from the exterior inward sufficient to prevent moisture condensation on the room side during winter.

9.25.3.2. Air Barrier System Properties

(1) Sheet and panel type materials intended to provide the principal resistance to air leakage shall have an air leakage characteristic not greater than 0.02 $L/(s \cdot m^2)$ measured at an air pressure differential of 75 Pa.

(2) Where polyethylene sheet used to provide the air-tightness in the *air barrier system* shall conform to CAN/CGSB-51.34-M, "Vapour Barrier, Polyethylene Sheet for Use in Building Construction".

9.25.3.3. Continuity of the Air Barrier System

(1) Where the *air barrier system* consists of an air-impermeable panel-type material, all joints shall be sealed to prevent air leakage.

(2) Where the *air barrier system* consists of flexible sheet material, all joints shall be,

(a) sealed, or

(b) lapped not less than 100 mm and clamped, such as between framing members, furring or blocking and rigid panels.

(3) Where an interior wall meets an exterior wall, ceiling, floor or roof required to be provided with an air barrier protection, the *air barrier system* shall extend across the intersection.

(4) Where an interior wall projects through a ceiling or extends to become an exterior wall, spaces in the wall shall be blocked to provide continuity across those spaces with the *air barrier system* in the abutting walls or ceiling.

(5) Where an interior floor projects through an exterior wall or extends to become an exterior floor, continuity of the *air barrier system* shall be maintained from the abutting walls across the floor assembly.

(6) Penetrations of the *air barrier system*, such as those created by the installation of doors, windows, electrical wiring, electrical boxes, piping or ductwork, shall be sealed to maintain the integrity of the *air barrier system* over the entire surface.

(7) Access hatches installed through assemblies constructed with an *air barrier system* shall be weatherstripped around their perimeters to prevent air leakage.

(8) Clearances between *chimneys* or *gas vents* and the surrounding construction that would permit air leakage from within the *building* into a wall or *attic or roof space* shall be sealed by *noncombustible* material to prevent such leakage.

9.25.4. Vapour Barriers

9.25.4.1. Required Barrier to Vapour Diffusion

(1) Thermally insulated wall, ceiling and floor assemblies shall be constructed with a *vapour barrier* sufficient to prevent condensation in the wall spaces, floor spaces or *attic or roof spaces*.

9.25.4.2. Vapour Barrier Materials

(1) *Vapour barriers* shall have a permeance not greater than 60 ng/(Pa·s·m^2), measured in accordance with ASTM E96, "Water Vapor Transmission of Materials", using the desiccant method (dry cup).

(2) Where the mild climate indicator, determined in accordance with Sentence 9.25.1.2.(6), is greater than 6300, *vapour barriers* shall be designed according to Part 5, where,

(a) the intended use of the interior space requires the indoor relative humidity to be maintained above 35% over the heating season and the ventilating and *air-conditioning* system is designed to maintain that relative humidity, or

(b) the intended use of the interior space results in an average monthly indoor relative humidity above 35% over the heating season and the ventilating and *air-conditioning* system does not have the capacity to reduce the average monthly relative humidity to 35% or less over that period.

(3) Where the mild climate indicator, determined in accordance with Sentence 9.25.1.2.(6), is less than or equal to 6300, *vapour barriers* shall be designed according to Part 5, where,

(a) the intended use of the interior space requires the indoor relative humidity to be maintained above 60% over the heating season and the ventilating and *air-conditioning* system is designed to maintain that relative humidity, or

(b) the intended use of the interior space results in an average monthly indoor relative humidity above 60% over the heating season and the ventilating and *air-conditioning* system does not have the capacity to reduce the average monthly relative humidity to 60% over that period.

(4) Where polyethylene is installed to serve as the *vapour barrier*, it shall conform to CAN/CGSB-51.34-M, "Vapour Barrier, Polyethylene Sheet for Use in Building Construction".

(5) Membrane-type *vapour barriers* other than polyethylene shall conform to CAN/CGSB-51.33-M, "Vapour Barrier, Sheet, Excluding Polyethylene, for Use in Building Construction".

(6) Where a coating is applied to gypsum board to function as the *vapour barrier*, the permeance of the coating shall be determined in accordance with CAN/CGSB-1.501-M, "Method for Permeance of Coated Wallboard".

9.25.4.3. Installation of Vapour Barriers

(1) *Vapour barriers* shall be installed to protect the entire surfaces of thermally insulated wall, ceiling and floor assemblies.

(2) *Vapour barriers* shall be installed sufficiently close to the warm side of insulation to prevent condensation at design conditions.

Section 9.26. Roofing

9.26.1. General

9.26.1.1. Purpose of Roofing

(1) Roofs shall be protected with roofing, including flashing, installed to shed rain effectively and prevent water due to ice damming from entering the roof.

(2) For the purpose of Sentence (1), roofs shall include platforms that effectively serve as roofs with respect to accumulation or drainage of precipitation.

9.26.1.2. Alternate Installation Methods

(1) Methods described in CAN3-A123.51-M, "Asphalt Shingle Application on Roof Slopes 1:3 and Steeper", or CAN3-A123.52-M, "Asphalt Shingle Application on Roof Slopes 1:6 to Less than 1:3", are permitted to be used for asphalt shingle applications not described in this Section.

9.26.1.3. Solar Collector Systems

(1) A solar collector system is permitted to be installed above roofing materials conforming to Sentence 9.26.2.1.(1).

9.26.2. Roofing Materials

9.26.2.1. Material Standards

(1) Roofing materials shall conform to,

(a) CAN/CGSB-37.4-M, "Fibrated, Cutback Asphalt, Lap Cement for Asphalt Roofing",

(b) CAN/CGSB-37.5-M, "Cutback Asphalt Plastic, Cement",

(c) CAN/CGSB-37.8-M, "Asphalt, Cutback, Filled, for Roof Coating",

(d) CGSB 37-GP-9Ma, "Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing",

(e) CGSB 37-GP-21M, "Tar, Cutback, Fibrated, for Roof Coating",

(f) CAN/CGSB-37.50-M, "Hot Applied, Rubberized Asphalt for Roofing and Waterproofing",

(g) CGSB 37-GP-52M, "Roofing and Waterproofing Membrane, Sheet Applied, Elastomeric",

(h) CAN/CGSB-37-GP-54, "Polyvinyl Chloride Roofing and Waterproofing Membrane",

(i) CGSB 37-GP-56M, "Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing",

(j) CGSB 41-GP-6M, "Sheets, Thermosetting Polyester Plastics, Glass Fiber Reinforced",

(k) CAN/CGSB-51.32-M, "Sheathing, Membrane, Breather Type",

(l) CAN/CSA-A123.1, "Asphalt Shingles Made from Organic Felt and Surfaced with Mineral Granules",

(m) CSA A123.2, "Asphalt Coated Roofing Sheets",

(n) CAN/CSA-A123.3, "Asphalt or Tar Saturated Roofing Felt",

(o) CAN/CSA-A123.4, "Asphalt for Constructing Built-Up Roof Coverings and Waterproofing Systems",

(p) CAN/CSA-A123.5, "Asphalt Shingles Made from Glass Felt and Saturated with Mineral Granules",

(q) CSA A123.17, "Asphalt-Saturated Felted Glass-Fibre Mat for Use in Construction of Built-Up Roofs",

(r) CAN/CSA-A220.0-M, "Performance of Concrete Roof Tiles",

(s) CSA O118.1, "Western Cedars Shakes and Shingles", or

(t) CSA O118.2-M, "Eastern White Cedar Shingles".

9.26.2.2. Nails

(1) Nails used for roofing shall be corrosion-resistant roofing or shingle nails conforming to CSA B111, "Wire Nails, Spikes and Staples".

(2) Nails shall have sufficient length to penetrate through or 12 mm into roof sheathing.

(3) Nails used with asphalt roofing shall have a head diameter of not less than 9.5 mm and a shank thickness of not less than 2.95 mm.

(4) Nails used with wood shingles or shakes shall have a head diameter of not less than 4.8 mm and a shank thickness of not less than 2.0 mm and shall be stainless steel, aluminum or hot-dipped galvanized.

9.26.2.3. Staples

(1) Staples used to apply asphalt or wood shingles shall be corrosion-resistant and shall be driven with the crown parallel to the eaves.

(2) Staples used with asphalt shingles shall be not less than 19 mm long, 1.6 mm diam or thickness, with not less than a 25 mm crown, except that an 11 mm crown may be used as provided in Sentence 9.26.7.4.(2).

(3) Staples used with wood shingles shall be not less than 29 mm long, 1.6 mm diam or thickness, with not less than a 9.5 mm crown and shall be stainless steel or aluminum.

9.26.3. Slope of Roof Surfaces

9.26.3.1. Slope

(1) Except as provided in Sentences (2) and (3), the slopes on which roof coverings may be applied shall conform to Table 9.26.3.1.

(2) Asphalt and gravel or coal tar and gravel roofs may be constructed with lower slopes than required in Sentence (1) when effective drainage is provided by roof drains located at the lowest points on the roofs.

(3) Profiled metal roof cladding systems specifically designed for low-slope applications are permitted to be installed with lower slopes than required in Sentence (1), provided they are installed in conformance with the manufacturer's written recommendations.

(4) Except where back-slope will not adversely affect adjacent supported or supporting elements due to water ingress, roofs and elements that effectively serve as roofs shall be constructed with sufficient slope away from,

(a) exterior walls, and

(b) *guards* that are connected to the roof, or to an element that effectively serves as a roof, by other than pickets or posts.

(5) The slope required in Sentence (4) shall be sufficient to maintain a positive slope,

(a) after expected shrinkage of the *building* frame, where these surfaces are supported by exterior walls and on exterior columns, and

(b) once design loading is taken into consideration, where these surfaces are cantilevered from exterior walls.

Table 9.26.3.1.
Roofing Types and Slope Limits

Forming Part of Sentence 9.26.3.1.(1)

Column 1	Column 2	Column 3
Type of Roofing	Minimum Slope	Maximum Slope
Asbestos-Cement Corrugated Sheets	1 in 4	no limit
Asphalt Shingles		
Low slope application	1 in 6	no limit
Normal application	1 in 3	no limit
Built-up Roofing		
Asphalt base (without gravel)	1 in 25	1 in 2
Asphalt base (gravelled)	1 in 50(1)	1 in 4
Coal-tar base (gravelled)	1 in 50(1)	1 in 25
Cold process	1 in 25	1 in 1.33
Cedar Shakes	1 in 3	no limit
Clay Tile	1 in 2	no limit
Glass Fibre Reinforced Polyester Roofing Panels	1 in 4	no limit
Modified Bituminous Membranes	1 in 50	1 in 4
Profiled Metal Roofing	1 in 4(2)	no limit
Roll Roofing		
480 mm wide selvage asphalt roofing	1 in 6	no limit
Cold application felt	1 in 50	1 in 1.33
Smooth and mineral surfaced	1 in 4	no limit
Sheet Metal Shingles	1 in 4(2)	no limit
Slate Shingles	1 in 2	no limit
Wood Shingles	1 in 4	no limit

Notes to Table 9.26.3.1.:

(1) See Sentence 9.26.3.1.(2).

(2) See Sentence 9.26.3.1.(3).

9.26.4. Flashing at Intersections

9.26.4.1. Required Flashing at Intersections

(1) Except where the omission will not adversely affect adjacent supported or supporting elements, flashing shall be installed at junctions between roofs and,

(a) walls that rise above the roof, and

(b) *guards* that are connected to the roof by other than pickets or posts.

(2) For the purpose of Sentence (1), roofs shall include platforms that effectively serve as roofs with respect to accumulation or drainage of precipitation.

9.26.4.2. Materials

(1) Sheet metal flashing shall consist of not less than,

(a) 1.73 mm thick sheet lead,

(b) 0.33 mm thick galvanized steel,

(c) 0.33 mm thick copper,

(d) 0.35 mm thick zinc, or

(e) 0.48 mm thick aluminum.

9.26.4.3. Valley Flashing

(1) Where sloping surfaces of shingled roofs intersect to form a valley, the valley shall be flashed.

(2) Valley flashing shall be installed over continuous sheathing.

(3) Closed valleys shall not be used with rigid shingles on slopes of less than 1 in 1.2.

(4) Closed valley flashing shall consist of sheet metal, self sealing composite membranes consisting of polyethylene and bituminous material or one layer of either Type S smooth surface roll roofing or Type M mineral surface roll roofing (mineral surface down) not less than 600 mm wide, and nails shall not penetrate the flashing within 75 mm of its edge or 124 mm of the bottom of the valley centreline.

(5) Open valleys shall be flashed with,

(a) at least one layer of sheet metal not less than 600 mm wide, or

(b) no fewer than 2 layers of roll roofing.

(6) The bottom layer of roofing required in Sentence (4) shall consist of not less than Type S smooth roll roofing or Type M mineral surface roll roofing (mineral surface down) not less than 457 mm wide, centred in the valley and fastened with nails spaced not more than 450 mm o.c. located 25 mm away from the edges.

(7) The top layer of roofing required in Sentence (4) shall consist of not less than Type M mineral surface roll roofing (mineral surface up), 914 mm wide, centred in the valley, applied over a 100 mm wide strip of cement along each edge of the bottom layer, and fastened with a sufficient number of nails to hold it in place until the shingles are applied.

9.26.4.4. Intersection of Shingle Roofs and Masonry

(1) The intersection of shingle roofs and masonry walls or *chimneys* shall be protected with flashing.

(2) Counter flashing required in Sentence (1) shall be embedded not less than 25 mm in the masonry and shall extend not less than 150 mm down the masonry and lap the lower flashing not less than 100 mm.

(3) Flashing along the slopes of a roof described in Sentence (1) shall be stepped so that there is not less than a 75 mm head lap in both the lower flashing and counter flashing.

(4) Where the roof described in Sentence (1) slopes upwards from the masonry, the flashing shall extend up the roof slope to a point equal in height to the flashing on the masonry, but not less than 1.5 times the shingle exposure.

9.26.4.5. Intersection of Shingle Roofs and Walls Other Than Masonry

(1) The intersection of shingle roofs and walls clad with other than masonry shall be protected with flashing.

(2) Flashing required in Sentence (1) shall be installed so that it extends up the wall not less than 75 mm behind the sheathing paper, and extends not less than 75 mm horizontally.

(3) Along the slope of the roof, the flashing required in Sentence (1) shall be stepped with not less than a 75 mm head lap.

9.26.4.6. Intersection of Built-Up Roofs and Masonry

(1) The intersection of built-up roofs with masonry walls or *chimneys* shall have a cant strip at the intersection and a roofing membrane shall be mopped over the cant strip and not less than 150 mm up the wall.

(2) Counter flashing installed over the intersection referred to in Sentence (1) shall be embedded not less than 25 mm in the masonry, and shall be of sufficient length to extend down not less than 150 mm, lapping the membrane on the masonry not less than 100 mm.

9.26.4.7. Intersection of Built-Up Roofs and Walls other than Masonry

(1) The intersection of built-up roofs with walls clad with other than masonry shall have a cant strip at the intersection.

(2) The roofing membrane shall be mopped over the cant strip referred to in Sentence (1).

(3) Flashing plies shall extend not less than 150 mm up the wall referred to in Sentence (1) behind the sheathing paper.

9.26.4.8. Chimney Saddles

(1) Except as otherwise permitted in Sentence (5), *chimney* saddles shall be installed where the upper side of a *chimney* on a sloping roof is more than 750 mm wide.

(2) *Chimney* saddles shall be covered with sheet metal or roofing material of equivalent weight and quality equivalent to the roofing.

(3) Saddles shall be flashed where they intersect the roof.

(4) The intersection of the saddle and the *chimney* shall be flashed and counterflashed as in Article 9.26.4.4.

(5) A *chimney* saddle need not be installed if the intersection between the *chimney* and roof is protected by sheet metal flashing that extends up the *chimney* to a height equal to at least one sixth the width of the *chimney*, but not less than 150 mm, and up the roof slope to a point equal in height to the flashing on the *chimney*, but not less than 1.5 times the shingle exposure.

(6) Flashing described in Sentence (5) at the *chimney* shall be counterflashed as required by Article 9.26.4.4.

9.26.5. Eave Protection for Shingles and Shakes

9.26.5.1. Required Eave Protection

(1) Except as provided in Sentence (2), eave protection shall be provided on shingle, shake or tile roofs, extending from the edge of the roof a minimum of 900 mm up the roof slope to a line not less than 300 mm inside the inner face of the exterior wall.

(2) Eave protection is not required,

(a) over unheated garages, carports and porches,

(b) where the roof overhang exceeds 900 mm measured along the roof slope from the edge of the roof to the inner face of the exterior wall,

(c) on roofs of asphalt shingles installed in accordance with Subsection 9.26.8.,

(d) on roofs with slopes of 1 in 1.5 or greater, or

(e) in regions with 3 500 or fewer degree-days.

9.26.5.2. Materials

(1) Eave protection shall be laid beneath the starter strip and shall consist of,

(a) No. 15 asphalt-saturated felt laid in two plies lapped 480 mm and cemented together with lap cement,

(b) Type M or S roll roofing laid with not less than 100 mm head and end laps cemented together with lap cement,

(c) glass fibre or polyester fibre coated base sheets, or

(d) self-sealing composite membranes consisting of modified bituminous coated material.

9.26.6. Underlay Beneath Shingles

9.26.6.1. Materials

(1) Except as required in Sentence (2), when underlay is used beneath shingles, it shall be,

(a) asphalt-saturated sheathing paper weighing not less than 0.195 kg/m², or

(b) No. 15 plain or perforated asphalt-saturated felt.

(2) Underlay used beneath wood shingles shall be breather type.

9.26.6.2. Installation

(1) When used with shingles, underlay shall be installed parallel to the eaves with head and end lap of not less than 50 mm.

(2) The top edge of each strip referred to in Sentence (1) shall be fastened with sufficient roofing nails to hold it in place until the shingles are applied.

(3) The underlay referred to in Sentence (1) shall overlap the eave protection by not less than 100 mm

9.26.7. Asphalt Shingles on Slopes of 1 in 3 or Greater

9.26.7.1. Coverage

(1) Coverage shall be not less than 2 thicknesses of shingle over the entire roof, disregarding cutouts.

9.26.7.2. Starter Strip

(1) A starter strip shall be installed along the lower edge of the roof so that it extends approximately 12 mm beyond the eaves and rake of the roof and fastened along the bottom edge with nails spaced not more than 300 mm o.c.

(2) Starter strips shall be at least Type M mineral-surfaced roll roofing not less than 300 mm wide, or shingles of the same weight and quality as those used as a roof covering with tabs facing up the roof slope.

(3) Starter strips need not be provided where eave protection of not less than Type M mineral-surfaced roll roofing is provided or self-sealing composite membranes consisting of polyethylene and bituminous material is provided.

9.26.7.3. Head Lap

(1) Shingles shall have a head lap of not less than 50 mm.

9.26.7.4. Fasteners

(1) Except as provided in Sentence (2), shingles shall be fastened with at least 4 nails or staples for 1 000 mm wide shingles so that no nails or staples are exposed.

(2) Where staples with an 11 mm crown are used, shingles shall be fastened with at least 6 staples.

(3) Fasteners may be reduced for narrower shingles in proportion to the width of the shingle or when shingles incorporating interlocking devices are used.

(4) Fasteners referred to in Sentences (1) and (2) shall be located 25 mm to 40 mm from each end of each strip shingle with other fasteners equally spaced between them.

(5) Fasteners referred to in Sentences (1) and (2) shall be located not less than 12 mm above the tops of the cutouts.

9.26.7.5. Securing of Tabs

(1) Shingle tabs shall be secured by a spot of plastic cement not exceeding 25 mm diam under the centre of each tab or by interlocking devices or self-sealing strips.

9.26.7.6. Hips and Ridges

(1) Shingles on hips and ridges shall be applied so they extend not less than 100 mm on either side of the hip or ridge, and shall be lapped not less than 150 mm.

(2) Shingles referred to in Sentence (1) shall be fastened with nails or staples on each side located not more than 25 mm from the edge and 25 mm above the butt of the overlying shingle.

9.26.7.7. Eave Protection

(1) Eave protection shall conform to Subsection 9.26.5.

9.26.7.8. Flashing

(1) Flashing shall conform to Subsection 9.26.4.

9.26.8. Asphalt Shingles on Slopes of Less Than 1 in 3

9.26.8.1. Coverage

(1) Except for the first 2 courses, coverage shall be not less than 3 thicknesses of shingle over the entire roof, disregarding cutouts.

9.26.8.2. Starter Strip

(1) A starter strip shall be installed as in Article 9.26.7.2.

(2) Starter strips required in Sentence (1) shall be laid in a continuous band of cement not less than 200 mm wide.

9.26.8.3. Securing of Tabs

(1) Shingle tabs shall be secured with cold application cement applied at the rate of not less than 0.5 L/m^2 of cemented area, or hot application asphalt applied at the rate of 1 kg/m^2 of cemented area.

9.26.8.4. Securing of Shingle Courses

(1) The first course of shingles shall be secured by a continuous band of cement along the eaves applied so that the width of the band equals the shingle exposure plus 100 mm.

(2) The succeeding courses of shingles shall be secured by a continuous band of cement applied so that the width of the band equals the shingle exposure plus 50 mm.

(3) The band required in Sentence (2) shall be located not more than 50 mm above the butt of the overlying course of shingles.

9.26.8.5. Hips and Ridges

(1) Shingles on hips and ridges shall be not less than 300 mm wide applied to provide triple coverage.

(2) Shingles referred to in Sentence (1) shall be cemented to the roof shingles and to each other with a coat of cement and fastened with nails or staples located 40 mm above the butt of the overlying shingle and 50 mm from each edge.

9.26.8.6. Flashing

(1) Flashing shall conform to Subsection 9.26.4.

9.26.8.7. Fastening

(1) Shingles shall be fastened in accordance with Article 9.26.7.4.

9.26.9. Wood Roof Shingles

9.26.9.1. Decking

(1) Decking for wood shingled roofs may be continuous or spaced.

9.26.9.2. Grade

(1) Western cedar shingles shall be not less than No. 2 grade.

(2) Eastern white cedar shingles shall be not less than B (clear) grade.

9.26.9.3. Size

(1) Wood shingles shall be not less than 400 mm long and not less than 75 mm nor more than 350 mm wide.

9.26.9.4. Spacing and Joints

(1) Shingles shall be spaced approximately 6 mm apart and offset at the joints in adjacent courses not less than 40 mm so that joints in alternate courses are staggered.

9.26.9.5. Fastening

(1) Shingles shall be fastened with 2 nails or staples located approximately 20 mm from the sides of the shingle and 40 mm above the exposure line.

9.26.9.6. Exposure

(1) The exposure of wood roof shingles shall conform to Table 9.26.9.6.

Table 9.26.9.6.
Exposure of Wood Shingles

Forming Part of Sentence 9.26.9.6.(1)

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
Roof Slope	Maximum Exposure, mm					
	No. 1 or A Grade Length of Shingle, mm			No. 2 or B Grade Length of Shingle, mm		
	400	450	600	400	450	600
<1 in 3	100	115	165	90	100	140
≥1 in 3	125	140	190	100	115	165

9.26.9.7. Flashing

(1) Flashing shall conform to Subsection 9.26.4.

9.26.9.8. Eave Protection

(1) Eave protection shall conform to Subsection 9.26.5.

9.26.10. Cedar Roof Shakes

9.26.10.1. Size and Thickness

(1) Shakes shall be not less than 450 mm long and not less than 100 mm nor more than 350 mm wide with a butt thickness of not more than 32 mm and not less than 9 mm.

9.26.10.2. Underlay

(1) Where eave protection is not provided, an underlay conforming to the requirements in Article 9.26.6.1. for wood shingles shall be laid as a strip not less than 900 mm wide along the eaves.

(2) A strip of material similar to that described in Sentence (1) not less than 450 mm wide shall be interlayed between each course of shakes with the bottom edge of the strip positioned above the butt line at a distance equal to double the exposure of the shakes.

(3) Interlayed strips in Sentence (2) shall be lapped at least 150 mm at hips and ridges in a manner that will prevent water from reaching the roof sheathing.

9.26.10.3. Spacing and Joints

(1) Shakes shall be spaced 6 mm to 9 mm apart and the joints in one course shall be separated not less than 40 mm from joints in adjacent courses.

9.26.10.4. Fastening

(1) Shakes shall be fastened with nails located approximately 20 mm from the sides of the shakes and 40 mm above the exposure line.

9.26.10.5. Exposure

(1) The exposure of wood shakes shall not exceed,

(a) 190 mm for shakes not less than 450 mm long, and

(b) 240 mm for shakes not less than 600 mm long.

9.26.10.6. Flashing

(1) Flashing shall conform to Subsection 9.26.4.

9.26.10.7. Eave Protection

(1) Eave protection shall conform to Subsection 9.26.5.

9.26.10.8. Grade

(1) Shakes shall be not less than No. 1 or Handsplit grade.

9.26.11. Built-Up Roofs

9.26.11.1. Quantity of Materials

(1) The quantities of bituminous materials used on built-up roofs shall conform to Table 9.26.11.1.

Table 9.26.11.1.
Quantities of Bitumen for Built-Up Roofs

Forming Part of Sentence 9.26.11.1.(1)

COLUMN 1	COLUMN 2	COLUMN 3
Type of Roof	Amount of Bitumen per Square Metre of Roof Surface	
	Mopping Coats Between Layers	Flood Coat
Asphalt and aggregate	1 kg	3 kg
Coal-tar and aggregate	1.2 kg	3.6 kg
Cold process roofing	0.75 L cold process cement	2 L cold process top coating

9.26.11.2. Coal-Tar and Asphalt Products

(1) Coal-tar products and asphalt products shall not be used together in built-up roof construction.

9.26.11.3. Roof Felts

(1) Bitumen roofing felts shall be not less than No.15 felt.

9.26.11.4. Aggregate Surfacing

(1) Aggregate used for surfacing built-up roofs shall be clean, dry and durable and shall consist of particles of gravel, crushed stone or air-cooled blast furnace slag having a size of from 6 mm to 15 mm.

(2) The minimum amount of aggregate surfacing per square metre of roof surface shall be 15 kg gravel or crushed stone or 10 kg crushed slag.

9.26.11.5. Flashing

(1) Flashing shall conform to Subsection 9.26.4.

9.26.11.6. Number of Layers

(1) Built-up roofing shall consist of at least 3 mopped-down layers of roofing felt flood coated with bitumen.

9.26.11.7. Installation of Layers

(1) In hot process applications each layer of bitumen-saturated felt shall be laid while the bitumen is hot, with each layer overlapping the previous one.

(2) The full width under each lap referred to in Sentence (1) shall be coated with bitumen so that in no place does felt touch felt.

(3) Felt shall be laid free of wrinkles and shall be rolled directly into the hot bitumen and broomed forward and outward from the centre to ensure complete adhesion.

9.26.11.8. Roofing over Wood-Based Sheathing

(1) Except as permitted in Sentence (2), built-up roofing applied over wood, plywood, OSB or waferboard roof sheathing shall be laid over an additional base layer of felt laid dry over the entire roof deck with at least a 50 mm headlap and a 50 mm sidelap between each sheet.

(2) Where plywood, OSB or waferboard roof sheathing is used, the dry layer of felt required in Sentence (1) may be omitted when the joints are taped and the sheathing is primed with asphalt.

9.26.11.9. Attachment to Decking

(1) Roofing shall be securely attached to the decking or where insulation is applied above the deck, the insulation shall be securely attached to the deck before the first layer of felt is fastened to the insulation.

9.26.11.10. Cant Strips

(1) Except as permitted in Sentence (4), a cant strip shall be provided at the edges of roofs.

(2) No fewer than 2 plies of the roofing membrane shall be carried over the top of the cant strip.

(3) Flashing shall extend over the top of the cant strip and be shaped to form a drip.

(4) The cant strip required in Sentence (1) may be omitted where a gravel stop is provided at the edge of roofs.

(5) The roofing membranes shall be carried over the edge of the roof before the gravel stop is fastened and 2 plies of roofing membrane mopped to the top surface of the gravel stop referred to in Sentence (4) before the flood coat is applied.

(6) The gravel stop referred to in Sentence (4) shall extend over the edge of the roof to form a drip or shall be flashed so that the flashing extends over the edge to form a drip.

9.26.12. Selvage Roofing

9.26.12.1. Double Coverage

(1) Wide selvage asphalt roofing shall provide double coverage over the entire roof surface.

9.26.12.2. Joints

(1) Plies of selvage roofing shall be cemented together to ensure a water-tight joint.

9.26.13. Sheet Metal Roofing

9.26.13.1. Thickness

(1) Sheet metal roofing shall be not less than,

(a) 0.33 mm thick galvanized steel,

(b) 0.46 mm thick copper,

(c) 0.46 mm thick zinc, or

(d) 0.48 mm thick aluminum.

9.26.13.2. Support

(1) Where sheet metal roofing is not supported by roof decking but spans between spaced supports, the panels shall be designed to support the specified *live loads* for roofs.

9.26.14. Glass Reinforced Polyester Roofing

9.26.14.1. Support

(1) Where glass reinforced polyester roofing panels are not supported by roof decking but span between spaced supports, the panels shall be designed to support the specified roof loads.

9.26.15. Hot Applied Rubberized Asphalt Roofing

9.26.15.1. Installation

(1) Hot applied rubberized asphalt roofing shall be installed in accordance with CAN/CGSB-37.51-M, "Application for Hot Applied Rubberized Asphalt for Roofing and Waterproofing".

9.26.16. Polyvinyl Chloride Sheet Roofing

9.26.16.1. Installation

(1) Polyvinyl chloride sheet applied roofing membrane shall be installed in accordance with CGSB 37-GP-55M, "Application of Sheet Applied Flexible Polyvinyl Chloride Roofing Membrane".

9.26.17. Concrete Roof Tiles

9.26.17.1. Installation

(1) Concrete roof tiles shall be installed according to CAN/CSA-A220.1-M, "Installation of Concrete Roof Tiles".

9.26.18. Roof Drains and Downspouts

9.26.18.1. Roof Drains

(1) When roof drains are provided they shall conform to Part 7.

9.26.18.2. Downspouts

(1) Where downspouts are provided and are not connected to a sewer, extensions shall be provided to carry rainwater away from the *building* in a manner that will prevent *soil* erosion.

Section 9.27. Cladding

9.27.1. Application

9.27.1.1. General

(1) Where lumber, wood shingles, shakes, fibre-cement shingles, planks and sheets, plywood, OSB, waferboard, hardboard, vinyl, aluminum and steel, including trim and soffits, are installed as cladding on wood-frame walls exposed to precipitation, the cladding assembly shall comply with,

(a) Subsections 9.27.2. to 9.27.13., or

(b) Part 5.

(2) Where stucco is installed as cladding on wood-frame or masonry walls exposed to precipitation, the cladding assembly shall comply with,

(a) Subsections 9.27.2. to 9.27.4., and Section 9.28., or

(b) Part 5.

(3) Where masonry serves as cladding on wood-frame or masonry walls exposed to precipitation, the cladding assembly shall comply with,

(a) Subsections 9.27.2. to 9.27.4., and Section 9.20., or

(b) Part 5.

(4) Where asphalt shingles are installed as cladding on wood-frame walls exposed to precipitation, the cladding assembly shall comply with,

(a) Subsections 9.26.7. and 9.27.2. to 9.27.4., or

(b) Part 5.

(5) Where cladding materials other than those described in Sentences (1) to (4) are installed, or where these are installed on substrates other than those identified in Sentences (1) to (4), the materials and installation shall comply with Part 5.

9.27.2. Required Protection from Precipitation

9.27.2.1. Minimizing and Preventing Ingress and Damage

(1) Except where exterior walls are protected from precipitation or where it can be shown that ingress will not adversely affect occupant health or safety, exterior walls shall be designed and constructed to,

(a) minimize the ingress of precipitation into the assembly, and

(b) prevent ingress into interior space.

(2) Except where exterior walls are protected from specific mechanisms of deterioration, such as mechanical impact and ultraviolet radiation, exterior walls shall be designed and constructed to minimize the likelihood of their required performance being reduced to an unacceptable level as a result of those mechanisms.

9.27.2.2. Minimum Protection from Precipitation Ingress

(1) Exterior walls exposed to precipitation shall be protected against ingress of precipitation with an exterior cladding assembly consisting of a first plane of protection and a second plane of protection where the wall encloses spaces of *residential occupancy* or spaces that directly serve spaces of *residential occupancy*.

9.27.2.3. First and Second Planes of Protection

(1) Where walls required to provide protection from precipitation comprise assemblies with first and second planes of protection,

(a) the first plane of protection shall,

(i) consist of cladding, with appropriate trim, accessory pieces and fasteners, and

(ii) be designed and constructed to minimize the passage of rain and snow into the wall by minimizing holes and managing precipitation ingress caused by kinetic energy of raindrops, surface tension, capillarity, gravity, and air pressure differences,

(b) the second plane of protection shall be designed and constructed to,

(i) intercept all precipitation that gets past the first plane of protection, and

(ii) effectively dissipate any precipitation to the exterior, and

(c) the protection provided by the first and second planes of protection shall be maintained at,

(i) wall penetrations created by the installation of components and services such as windows, doors, ventilation ducts, piping, wiring and electrical outlets, and

(ii) the interface with other wall assemblies.

9.27.2.4. Protection of Cladding from Moisture

(1) A clearance of not less than 200 mm shall be provided between finished ground and cladding that is adversely affected by moisture, such as untreated wood, plywood, OSB, waferboard and hardboard.

(2) A clearance of not less than 50 mm shall be provided between a roof surface and cladding that is adversely affected by moisture, such as untreated wood, plywood, OSB, waferboard and hardboard.

9.27.3. Second Plane of Protection

9.27.3.1. Elements of the Second Plane of Protection

(1) The second plane of protection shall consist of a drainage plane with appropriate inner boundary and flashing to dissipate rainwater to the exterior.

(2) The inner boundary of the drainage plane shall comply with Articles 9.27.3.2. to 9.27.3.6.

(3) The protection provided by the second plane of protection shall be maintained,

(a) at wall penetrations created by the installation of components and services such as windows, doors, ventilation ducts, piping, wiring and electrical outlets, and

(b) at the interface with other wall assemblies.

(4) Flashing material and installation shall comply with Articles 9.27.3.7. and 9.27.3.8.

9.27.3.2. Sheathing Membrane Material Standard

(1) Sheathing membranes shall conform to the performance requirements of CAN/CBSB-51.32-M, "Sheathing, Membrane, Breather Type".

9.27.3.3. Required Sheathing Membrane and Installation

(1) Except as provided in Articles 9.27.3.4. to 9.27.3.6., at least one layer of sheathing membrane shall be applied beneath siding, stucco or masonry veneer.

(2) Sheathing membrane required in Sentence (1) shall be applied so that joints are lapped not less than 100 mm.

(3) Where sheathing membrane required in Sentence (1) is applied horizontally, the upper sheets shall overlap the lower sheets.

9.27.3.4. Insulating Sheathing in Lieu of Sheathing Membrane

(1) Where non-wood-based rigid exterior insulating sheathing, or exterior insulating sheathing with an integral sheathing membrane is installed, a separate sheathing membrane is not required.

(2) Where insulating sheathing is installed as provided in Sentence (1),

(a) sheathing panels subject to moisture deterioration shall be sealed at all joints, and

(b) the joints of sheathing panels not subject to moisture deterioration shall be,

  (i) sealed at all joints, or

  (ii) lapped or tongue and groove, and detailed to ensure drainage of water to the exterior.

9.27.3.5. Sheathing Membranes in Lieu of Sheathing

(1) Except as provided in Article 9.27.3.6., where no sheathing is used, at least 2 layers of sheathing membrane shall be applied beneath the cladding.

(2) All joints in the sheathing membrane required in Sentence (1) shall occur over framing, and the membrane shall be fastened to the framing with roofing nails or staples spaced not more than 150 mm along the edges of the outer layer of sheathing paper.

(3) Wall sheathing is permitted to be used in lieu of 1 layer of sheathing membrane required in Sentence (1), and the thickness need not conform to Table 9.23.16.2.A.

9.27.3.6. Face Sealed Cladding

(1) Sheathing membrane is permitted to be omitted beneath cladding when the joints in the cladding are formed to effectively prevent the passage of wind and rain in conformance with Sentence (2) or (3), as applicable.

(2) Cladding consisting of sheets of plywood, hardboard, OSB, waferboard or fibre cement is considered to meet the requirements of Sentence (1), provided the cladding is applied so that

(a) all edges are directly supported by framing, and

(b) the vertical joints between adjacent sheets are sealed and,

  (i) covered with battens,

  (ii) shiplapped, or

  (iii) otherwise matched to provide weathertight joints, and

(c) the horizontal joints between adjacent sheets are sealed and,

  (i) shiplapped, or

  (ii) otherwise matched to provide weathertight joints.

(3) Metal siding consisting of sheets of metal is considered to meet the requirements of Sentence (1) where the joints between sheets are of the locked-seam type.

9.27.3.7. Flashing Materials

(1) Flashing shall consist of not less than,

(a) 1.73 mm thick sheet lead,

(b) 0.33 mm thick galvanized steel,

(c) 0.46 mm thick copper,

(d) 0.46 mm thick zinc,

(e) 0.48 mm thick aluminum, or

(f) 1.02 mm thick vinyl.

9.27.3.8. Flashing Installation

(1) Except as provided in Sentence (2), flashing shall be installed at,

(a) every horizontal junction between claddings elements,

(b) every horizontal offset in the cladding, and

(c) every horizontal line where the cladding substrates change and where,

  (i) the substrates differ sufficiently for stresses to be concentrated along that line, or

  (ii) the installation of the cladding on the lower substrate may compromise the drainage of moisture from behind the cladding above.

(2) Flashing need not be installed as described in Sentence (1),

(a) where the upper cladding elements overlap the lower cladding elements by not less than 25 mm,

(b) where,

(i) the cladding above and below the joint is installed outboard of a drained and vented air space, and

(ii) the horizontal detail is constructed so as to minimize ingress of precipitation into the air space, or

(c) at horizontal construction joints in stucco, where,

(i) the joint is finished with an expansion-contraction strip, and

(ii) the cladding is installed outboard of a drained and vented air space.

(3) Except as provided in Sentence (6), flashing shall be installed over exterior wall openings where the vertical distance from the bottom of the eave to the top of the trim is more than one-quarter of the horizontal overhang of the eave.

(4) Flashing described in Sentences (1) and (3) shall,

(a) extend not less that 50 mm upward inboard of the sheathing membrane or sheathing installed in lieu of the sheathing membrane,

(b) have a slope of not less than 6% toward the exterior after the expected shrinkage of the *building* frame,

(c) terminate at each end with an end-dam,

(i) with a height in millimetres not less than 25 mm or 1/10 of the value of the 1 in 5 driving rain wind pressure in Pa, and

(ii) at the height defined in Subclause (c)(i), extending to the face of the adjacent cladding,

(d) lap not less than 10 mm vertically over the *building* element below, and

(e) terminate in a drip extending not less than 5 mm outward from the outer face of the *building* element below.

(5) Except as provided in Sentence (6), where the sills of windows and doors installed in exterior walls are not self-flashing, flashing shall be installed between the underside of the window or door and the wall construction below.

(6) Where a window or exterior door is provided with an integral exterior flange and is designed to be installed on the exterior of essentially flat lock-seam metal cladding without a head or sill flashing, the flange shall be,

(a) bedded into a non-hardening sealant material, and

(b) screwed down over the sealant through to the wall framing to form a waterproof joint.

9.27.4. Caulking

9.27.4.1. Required Caulking

(1) Caulking shall be provided where required to prevent the entry of water into the structure.

(2) Caulking shall be provided between masonry, siding or stucco and the adjacent door and window frames or trim, including sills unless such locations are completely protected from the entry of rain.

(3) Caulking shall be provided at vertical joints between different cladding materials unless the joint is suitably lapped or flashed to prevent the entry of rain.

9.27.4.2. Materials

(1) Caulking shall be,

(a) a non-hardening type suitable for exterior use,

(b) selected for its ability to resist the effects of weathering, and

(c) compatible with and adhere to the substrate to which it is applied.

(2) Caulking shall conform to,

(a) CGSB 19-GP-5M, "Sealing Compound, One Component, Acrylic Base, Solvent Curing",

(b) CAN/CGSB-19.13-M, "Sealing Compound, One Component, Elastomeric, Chemical Curing",

(c) CGSB 19-GP-14M, "Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing", or

(d) CAN/CGSB-19.24-M, "Multicomponent, Chemical Curing Sealing Compound".

9.27.5. Attachment of Cladding

9.27.5.1. Attachment

(1) Except as permitted in Sentences (2) to (7), cladding shall be fastened to the framing members or furring members, or to blocking between the framing members.

(2) Vertical lumber and stucco lath or reinforcing are permitted to be attached to sheathing only where the sheathing consists of not less than,

(a) 14.3 mm lumber,

(b) 12.5 mm plywood, or

(c) 12.5 mm OSB or waferboard.

(3) Vertically applied metal siding and wood shingles and shakes are permitted to be attached to the sheathing only where the sheathing consists of not less than,

(a) 14.3 mm lumber,

(b) 7.5 mm plywood, or

(c) 7.5 mm OSB or waferboard.

(4) Asbestos-cement shingles are permitted to be attached to the sheathing only when the sheathing consists of not less than,

(a) 14.3 mm lumber,

(b) 9.5 mm plywood, or

(c) 9.5 mm OSB or waferboard.

(5) Where wood shingles or shakes are applied to sheathing that is not suitable for attaching the shingles or shakes, the shingles or shakes may be attached to a wood lath not less than 38 mm by 9.5 mm thick securely nailed to the framing and applied as described in Article 9.27.7.5.

(6) Where asbestos-cement shingles are applied to sheathing that is not suitable for attaching the shingles, the shingles may be fastened to a wood lath not less than 89 mm by 9.5 mm thick securely nailed to the framing.

(7) Lath referred to in Sentence (6) shall be applied so that it overlaps the preceding shingle course by not less than 20 mm.

9.27.5.2. Blocking

(1) Blocking for the attachment of cladding shall be not less than 38 mm by 38 mm lumber securely nailed to the framing and spaced not more than 600 mm o.c.

9.27.5.3. Furring

(1) Except as permitted in Sentences 9.27.5.1.(5) and (6), furring for the attachment of cladding shall be not less than 19 mm by 38 mm lumber when applied over sheathing.

(2) When applied without sheathing, furring referred to in Sentence (1) shall be not less than,

(a) 19 mm by 64 mm lumber on supports spaced not more than 400 mm o.c., or

(b) 19 mm by 89 mm on supports spaced not more than 600 mm o.c.

(3) Furring referred to in Sentence (1) shall be,

(a) securely fastened to the framing, and

(b) spaced not more than 600 mm o.c.

9.27.5.4. Size and Spacing of Fasteners

(1) Nail or staple size and spacing for the attachment of cladding and trim shall conform to Table 9.27.5.4.

Table 9.27.5.4.
Attachment of Cladding

Forming Part of Sentence 9.27.5.4.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
Type of Cladding	Minimum Nail or Staple Length, mm	Minimum Number of Nails or Staples	Maximum Nail or Staple Spacing, mm (o.c.)
Wood trim	51	—	600
Lumber siding or horizontal siding made from sheet metal	51	—	600
Metal cladding	38	—	600 (nailed to framing) 400 (nailed to sheathing only)

COLUMN 1 Type of Cladding	COLUMN 2 Minimum Nail or Staple Length, mm	COLUMN 3 Minimum Number of Nails or Staples	COLUMN 4 Maximum Nail or Staple Spacing, mm (o.c.)
Wood shakes			
up to 200 mm in width	51	2	—
over 200 mm in width	51	3	—
Wood shingles			
200 mm in width	32	2	—
over 200 mm in width	32	3	—
Asbestos-cement shingles	32	2	—
Panel or sheet type cladding			
up to 7 mm thick	38	—	150 (along edges)
more than 7 mm thick	51	—	300 (along intermediate supports)

9.27.5.5. Fastener Materials

(1) Nails or staples for the attachment of cladding and wood trim shall be corrosion-resistant and shall be compatible with the cladding material.

9.27.5.6. Expansion and Contraction

(1) Fasteners for metal or vinyl cladding shall be positioned to permit expansion and contraction of the cladding.

9.27.5.7. Penetration of Fasteners

(1) Fasteners for shakes and shingles shall penetrate through the nail-holding base or not less than 19 mm into the framing.

(2) Fasteners for cladding other than that described in Sentence (1) shall penetrate through the nail-holding base or not less than 25 mm into the framing.

9.27.6. Lumber Siding

9.27.6.1. Materials

(1) Lumber siding shall be sound, free of knot holes, loose knots, through checks or splits.

9.27.6.2. Thickness and Width

(1) Drop, rustic, novelty, lapped board and vertical wood siding shall be not less than 14.3 mm thick and not more than 286 mm wide.

(2) Bevel siding shall be,

(a) not less than 5 mm thick at the top, and

(b) not less than,

(i) 12 mm thick at the butt for sidings 184 mm or less in width, and

(ii) 14.3 mm thick at the butt for sidings wider than 184 mm.

(3) Bevel siding shall be not more than 286 mm wide.

9.27.6.3. Joints

(1) Lumber siding shall prevent water from entering at the joints by the use of lapped or matched joints or by vertical wood battens.

(2) Siding shall overlap not less than 1 mm per 16 mm width of lumber, but not less than,

(a) 9.5 mm for matched siding,

(b) 25 mm for lapped bevel siding, or

(c) 12 mm for vertical battens.

9.27.7. Wood Shingles and Shakes

9.27.7.1. Materials

(1) Shingles and shakes shall conform to,

(a) CSA O118.1, "Western Cedars Shakes and Shingles", or

(b) CSA O118.2-M, "Eastern White Cedar Shingles".

(2) Western cedar shakes shall be not less than No. 1 grade or Handsplit grade, and western cedar shingles not less than No. 2 grade, except that No. 3 grade may be used for undercoursing.

(3) Eastern white cedar shakes shall be at least B (clear) grade, except that C grade may be used for undercoursing.

9.27.7.2. Width

(1) Shingles and shakes shall be not less than 65 mm or more than 350 mm wide.

9.27.7.3. Fasteners

(1) Shingles or shakes shall be fastened with nails located approximately 20 mm from each edge and not less than 25 mm above the exposure line for single-course applications, or approximately 50 mm above the butt for double-course applications.

9.27.7.4. Offsetting of Joints

(1) In single-course application, joints in succeeding courses shall be offset at least 40 mm so that joints in any 2 of 3 consecutive courses are staggered.

(2) In double-course application, joints in the outer course shall be offset from joints in the under-course by not less than 40 mm, and joints in succeeding courses shall be offset not less than 40 mm.

9.27.7.5. Fastening to Lath

(1) When lath is used with double-course application (see Sentence 9.27.5.1.(5)), it shall be spaced according to the exposure and securely fastened to the framing.

(2) The butts of the under-course of the application referred to in Sentence (1) shall rest on the top edge of the lath.

(3) The outer course of the application referred to in Sentence (1) shall be fastened to the lath with nails of sufficient length to penetrate through the lath.

(4) The butts of the shingles or shakes shall be so located that they project not less than 12 mm below the bottom edge of the lath referred to in Sentence (1).

(5) If wood lath is not used, the butts of the under-course shingles or shakes of the application referred to in Sentence (1) shall be located 12 mm above the butts of the outer course.

9.27.7.6. Exposure and Thickness

(1) The exposure and butt thickness of shingles and shakes shall conform to Table 9.27.7.6.

Table 9.27.7.6.
Exposure and Thickness of Wood Shingles and Shakes

Forming Part of Sentence 9.27.7.6.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
Shake or Shingle Length, mm	Maximum Exposure, mm		Minimum Butt Thickness, mm
	Single Coursing	Double Coursing	
400	190	305	10
450	216	356	11
600	292	406	13

9.27.8. Asbestos-Cement Shingles and Sheets

9.27.8.1. Material Standards

(1) Asbestos-cement shingles and sheets shall conform to,

(a) CAN/CGSB-34.4-M, "Siding, Asbestos-Cement, Shingles and Clapboards",

(b) CAN/CGSB-34.5-M, "Sheets, Asbestos-Cement, Corrugated",

(c) CAN/CGSB-34.14-M, "Sheets, Asbestos-Cement, Decorative",

(d) CAN/CGSB-34.16, "Sheets, Asbestos-Cement, Flat, Fully Compressed",

(e) CAN/CGSB-34.17-M, "Sheets, Asbestos-Cement, Flat, Semicompressed", or

(f) CAN/CGSB-34.21-M, "Panels, Sandwich Asbestos-Cement with Insulating Cores".

9.27.8.2. Weight and Thickness

(1) Asbestos-cement shingles shall weigh not less than 8.06 kg/m².

(2) Asbestos-cement sheet shall be not less than,

(a) 4.75 mm thick where applied to studs spaced not more than 400 mm o.c., and,

(b) 6 mm thick where applied to studs spaced not more than 600 mm o.c.

(3) Where applied over sheathing, the thickness of asbestos-cement sheet shall be not less than 3.15 mm.

9.27.8.3. Fastening of Shingles

(1) Asbestos-cement shingles shall be fastened with nails located not less than 25 mm above the exposure line.

9.27.8.4. Joints of Shingles

(1) Asbestos-cement shingles shall be installed so that vertical joints in succeeding courses are staggered.

(2) Asphalt-coated backer strips shall be installed behind each vertical joint.

(3) Shingles referred to in Sentence (1) shall have not less than a 25 mm head lap.

9.27.8.5. Joints in Panels

(1) Vertical joints of asbestos-cement panels shall be protected with batten strips, caulking or other suitable method.

(2) Horizontal joints of asbestos-cement panels shall be lapped, flashed, caulked or otherwise suitably protected.

9.27.9. Plywood

9.27.9.1. Material Standards

(1) Plywood cladding shall be exterior type conforming to,

(a) CSA O115-M, "Hardwood and Decorative Plywood",

(b) CSA O121-M, "Douglas Fir Plywood",

(c) CSA O151, "Canadian Softwood Plywood", or

(d) CSA O153-M, "Poplar Plywood".

9.27.9.2. Thickness

(1) Plywood cladding shall be not less than 6 mm thick when applied directly to sheathing.

(2) When applied directly to framing or over furring strips, plywood cladding thickness shall conform to Table 9.27.9.2.

Table 9.27.9.2.
Minimum Plywood Cladding Thickness

Forming Part of Sentence 9.27.9.2.(2)

COLUMN 1	COLUMN 2	COLUMN 3
Spacing of Supports, mm	Minimum Thickness, mm, where Face Grain Parallel to Supports	Minimum Thickness, mm, where Face Grain at Right Angles to Supports
400	8	6
600	11	8

(3) The thickness of grooved or textured plywood shall be measured at the point of least thickness.

9.27.9.3. Edge Treatment

(1) The edges of plywood cladding shall be treated with a suitable paint or sealer.

9.27.9.4. Panel Cladding

(1) Plywood applied in panels shall have all edges supported.

(2) Not less than a 2 mm gap shall be provided between panels referred to in Sentence (1).

(3) Vertical joints in cladding referred to in Sentence (1) shall be protected with batten strips or caulking when the plywood joints are not matched.

(4) Horizontal joints in cladding referred to in Sentence (1) shall be lapped not less than 25 mm or shall be suitably flashed.

9.27.9.5. Lapped Strip Siding

(1) Plywood applied in horizontal lapped strips shall have not less than a 2 mm gap provided at the butted ends, which shall be caulked.

(2) The horizontal joints of siding described in Sentence (1) shall be lapped not less than 25 mm.

(3) Wedges shall be inserted under all vertical butt joints and at all corners when horizontal lapped plywood is applied without sheathing.

9.27.10. Hardboard

9.27.10.1. Material Standards

(1) Factory-finished hardboard cladding shall conform to CAN/CGSB-11.5M, "Hardboard, Precoated, Factory-Finished, for Exterior Cladding".

(2) Hardboard cladding that is not factory finished shall conform to Types 1, 2 or 5 in CAN/CGSB-11.3-M, "Hardboard".

9.27.10.2. Thickness

(1) Type 1 or 2 hardboard cladding shall be not less than,

(a) 6.0 mm thick when applied over sheathing that provides continuous support, and

(b) 7.5 mm thick when applied to furring or framing members not more than 400 mm o.c.

(2) Type 5 hardboard cladding shall be not less than 9.0 mm thick when applied over sheathing that provides continuous support or over furring or framing members spaced not more than 400 mm o.c.

(3) Where hardboard cladding is grooved, the grooves shall not extend more than 1.5 mm into the minimum required thickness.

9.27.10.3. Panel Cladding

(1) Hardboard cladding applied in panels shall have all edges supported with not less than a 5 mm gap provided between sheets.

(2) Vertical joints in cladding described in Sentence (1) shall be protected with batten strips or caulking when the joints are not matched.

(3) Horizontal joints in cladding described in Sentence (1) shall be lapped not less than 25 mm or shall be suitably flashed.

9.27.10.4. Lapped Strip Siding

(1) Hardboard applied in horizontal lapped strips shall have not less than a 5 mm gap provided at the butted ends, which shall be caulked or otherwise protected with suitable mouldings.

(2) The horizontal joints of siding described in Sentence (1) shall overlap not less than 1 mm per 16 mm width of siding board but not less than 9.5 mm for matched joint siding or 25 mm for lapped siding.

9.27.10.5. Clearance

(1) Not less than 3 mm clearance shall be provided between hardboard siding and door or window frames.

9.27.11. OSB and Waferboard

9.27.11.1. Material Standard

(1) OSB and waferboard cladding shall conform to CSA O437.0, "OSB and Waferboard".

9.27.11.2. Thickness

(1) OSB conforming to O-2 grade shall be not less than 6.0 mm thick where applied directly to sheathing.

(2) OSB conforming to O-2 grade applied directly to framing or over furring strips, shall conform to the thickness shown for plywood in Table 9.27.9.2.

(3) OSB conforming to O-1 grade and waferboard conforming to R-1 grade shall be not less than 7.9 mm thick where applied directly to sheathing.

(4) Where applied directly to framing or over furring strips, OSB conforming to O-1 grade and waferboard conforming to R-1 grade shall be not less than,

(a) 9.5 mm thick on supports spaced not more than 400 mm o.c., and

(b) 12.7 mm thick on supports spaced not more than 600 mm o.c.

9.27.11.3. Panel Cladding

(1) OSB and waferboard applied in panels shall have all edges supported and treated with a primer or sealer.

(2) Not less than a 3 mm gap shall be provided between sheets in cladding described in Sentence (1).

(3) Vertical joints in cladding described in Sentence (1) shall be protected with batten strips or caulking when the OSB and waferboard joints are not matched.

(4) Horizontal joints in cladding described in Sentence (1) shall be lapped not less than 25 mm or shall be suitably flashed.

9.27.11.4. Clearance

(1) At least a 3 mm clearance shall be provided between OSB and waferboard cladding and door or window frames.

9.27.12. Metal

9.27.12.1. Material Standards

(1) Horizontal and vertical strip steel siding, including flashing and trim accessories, shall conform to CAN/CGSB-93.4, "Galvanized Steel and Aluminum-Zinc Alloy Coated Steel Siding, Soffits and Fascia, Prefinished, Residential".

(2) Steel sheet cladding shall have a minimum thickness of 0.3 mm and conform to CAN/CGSB-93.3-M, "Prefinished Galvanized and Aluminum-Zinc Alloy Steel Sheet for Residential Use".

(3) Horizontal and vertical strip aluminum siding, including flashing and trim accessories, shall conform to CAN/CGSB-93.2-M, "Prefinished Aluminum Siding, Soffits and Fascia, for Residential Use".

(4) Aluminum sheet cladding shall conform to CAN/CGSB-93.1-M, "Sheet, Aluminum Alloy, Prefinished, Residential" and shall have a thickness of not less than 0.58 mm, except that siding supported by backing or sheathing shall have a thickness of not less than 0.46 mm.

9.27.13. Vinyl Siding

9.27.13.1. Material Standard

(1) Vinyl siding, including flashing and trim accessories, shall conform to CAN/CGSB-41.24, "Rigid Vinyl Siding, Soffits and Fascia".

9.27.13.2. Attachment

(1) The attachment of vinyl siding shall conform to the requirements in Subsection 9.27.5. for metal siding.

Section 9.28. Stucco

9.28.1. General

9.28.1.1. Sheathing Beneath Stucco

(1) Sheathing shall be provided beneath stucco applied over wood-frame walls except as permitted in Article 9.28.4.2.

(2) Where applied beneath stucco, sheathing shall conform to Subsection 9.23.16.

9.28.1.2. Lath and Reinforcing

(1) Stucco lath or reinforcing shall be used to attach stucco to any substrate other than masonry.

(2) Stucco lath or reinforcing shall be used to attach stucco to masonry where,

(a) the masonry is soft-burned tile or brick of less strength than the stucco, or

(b) the masonry surface is not sound, clean and sufficiently rough to provide a good key.

(3) Stucco applied over masonry *chimneys* shall be reinforced.

9.28.1.3. Concrete Masonry Units

(1) Stucco finish shall not be applied over concrete masonry units less than one month old unless the units have been cured by the autoclave process.

9.28.1.4. Clearance over Ground Level

(1) Stucco shall be not less than 200 mm above finished ground level except when it is applied over concrete or masonry.

9.28.1.5. Flashing and Caulking

(1) Flashing and caulking used with stucco shall conform to Subsections 9.27.3. and 9.27.4., except that if aluminum flashing is used, it shall be separated from the stucco by an impervious membrane or coating.

9.28.2. Stucco Materials

9.28.2.1. Portland Cement

(1) Portland cement shall conform to CAN/CSA-A3001, "Cementitious Materials for Use in Concrete".

9.28.2.2. Aggregate

(1) Aggregate shall be clean, well-graded natural sand or sand manufactured from crushed stone, gravel or air-cooled blast furnace slag and shall contain no significant amounts of deleterious material.

(2) Aggregate grading shall conform to Table 9.28.2.2.

Table 9.28.2.2.
Aggregate Grading for Stucco

Forming Part of Sentence 9.28.2.2.(2)

COLUMN 1	COLUMN 2	COLUMN 3
Sieve Sizes, mm	% Aggregate Passing Sieve	
	Maximum	Minimum
4	—	100
2	—	90
1	90	60
0.5	60	45
0.25	30	10
0.125	5	—

9.28.2.3. Water

(1) Water shall be clean and free of significant amounts of deleterious material.

9.28.3. Fasteners

9.28.3.1. Materials

(1) Fasteners for stucco lath or reinforcing shall be corrosion-resistant and of a material other than aluminum.

9.28.3.2. Nails and Staples

(1) Nails for stucco lath or reinforcing shall be not less than 3.2 mm diam with a head diameter of not less than 11.1 mm.

(2) Staples for stucco lath reinforcing shall be not less than 1.98 mm diam or thickness.

(3) Staples and nails for attaching stucco lath or reinforcing to vertical surfaces shall be of sufficient length to penetrate 25 mm into framing members or to the full depth of the sheathing where the sheathing is used for attachment.

(4) On horizontal surfaces nails for stucco lath or reinforcing shall be not less than 38 mm long.

9.28.4. Stucco Lath

9.28.4.1. Materials

(1) Rib lath or expanded metal stucco mesh shall be,

(a) copper-alloy steel coated with rust-inhibitive paint after fabrication, or

(b) galvanized.

(2) Woven or welded wire mesh shall be galvanized.

9.28.4.2. No Sheathing Required

(1) Sheathing need not be provided beneath stucco where not less than 1.19 mm diam galvanized wire is applied horizontally to the framing at vertical intervals not exceeding 150 mm, or where paper-backed welded wire metal lath is used.

9.28.4.3. Stucco Lath Specifications

(1) Stucco lath shall conform to Table 9.28.4.3.

Table 9.28.4.3.
Stucco Lath

Forming Part of Sentence 9.28.4.3.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5
Location	Type of Lath	Minimum Diam. of Wire, mm	Maximum Mesh Opening	Minimum Mass, kg/m^2
Vertical surfaces	Welded or woven wire	1.15	25 mm	—
		1.30	38 mm	—
		1.50	51 mm	—
	Stucco mesh reinforcing (expanded metal)	—	25.8 cm^2	0.98
Horizontal surfaces	9.5 mm rib lath	—	—	1.84
	Cedar lath	—	—	—

9.28.4.4. Self-Furring Devices

(1) Stucco lath shall be held not less than 6 mm away from the backing by means of suitable self-furring devices.

9.28.4.5. Application of Stucco Lath

(1) Stucco lath shall be applied with the long dimension horizontal.

(2) Horizontal and vertical joints in stucco lath shall be lapped not less than 50 mm.

(3) End joints of stucco lath shall be staggered and shall occur over framing members.

(4) External corners of stucco lath shall be reinforced with a vertical strip of lath or reinforcing extending not less than 150 mm on both sides of the corner, or the lath or reinforcing shall extend around corners not less than 150 mm.

9.28.4.6. Fastening

(1) Stucco lath shall be fastened in conformance with Subsection 9.27.5.

(2) Fasteners on vertical surfaces shall be spaced not more than,

(a) 150 mm o.c. vertically and 400 mm o.c. horizontally, or

(b) 100 mm o.c. vertically and 600 mm o.c. horizontally.

(3) Nailing patterns other than those required in Sentence (2) are permitted to be used provided there are not fewer than 20 fasteners per square metre of wall surface.

(4) Fasteners on horizontal surfaces shall be spaced not more than,

(a) 150 mm o.c. along the framing members when members are spaced not more than 400 mm o.c., and

(b) 100 mm o.c. along members when members are spaced not more than 600 mm o.c.

9.28.5. Stucco Mixes

9.28.5.1. Mixes

(1) Stucco mixes shall conform to Table 9.28.5.1.

Table 9.28.5.1.
Stucco Mixes

Forming Part of Sentence 9.28.5.1.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
Materials, volume			
Portland Cement	Masonry Cement	Lime	Aggregate
1	---	0.25 to 1	3.25 to 4 parts per part of cementitious material
1	1	---	

9.28.5.2. Pigments

(1) Pigment if used shall consist of pure mineral oxides inert to the action of sun, lime and cement.

(2) Pigment shall not exceed 6% of the portland cement by weight.

9.28.5.3. Mixing

(1) Materials shall be thoroughly mixed before and after water is added.

(2) Stucco shall be applied not later than 3 h after the initial mixing.

9.28.6. Stucco Application

9.28.6.1. Low Temperature Conditions

(1) The base for stucco shall be maintained above freezing.

(2) Stucco shall be maintained at a temperature of not less than 10°C during application and for not less than 48 h afterwards.

9.28.6.2. Number of Coats and Total Thickness

(1) Stucco shall be applied with at least 2 base coats and one finish coat, providing a total thickness of not less than 15 mm, measured from the face of the lath or face of the masonry where no lath is used.

9.28.6.3. First Coat

(1) The first coat shall be not less than 6 mm thick, measured from the face of the lath or masonry, fully embedding the lath.

(2) The surface of the first coat shall be scored to provide a key with the second coat.

9.28.6.4. Second Coat

(1) The second coat shall be not less than 6 mm thick.

(2) The surface of the second shall be lightly roughened to provide a key with the finish coat if the finish coat is other than stone dash.

9.28.6.5. Finish Coat

(1) When the finish coat is other than stone dash, the base shall be dampened but not saturated before the finish coat is applied.

(2) The thickness of the finish coat shall be not less than 3 mm.

(3) When a stone dash finish is used, the stone shall be partially embedded in the second coat before the second coat starts to set or stiffen.

Section 9.29. Interior Wall and Ceiling Finishes

9.29.1. General

9.29.1.1. Fire Protection and Sound Control

(1) A wall or ceiling finish shall also conform to the appropriate requirements in Sections 9.10. and 9.11. in addition to the requirements in this Section.

9.29.2. Waterproof Wall Finish

9.29.2.1. Where Required

(1) Waterproof finish shall be provided to a height of not less than,

(a) 1 800 mm above the floor in shower stalls,

(b) 1 200 mm above the rims of bathtubs equipped with showers, and

(c) 400 mm above the rims of bathtubs not equipped with showers.

9.29.2.2. Materials

(1) Waterproof finish shall consist of ceramic, plastic or metal tile, sheet vinyl, tempered hardboard, laminated thermosetting decorative sheets or linoleum.

9.29.3. Wood Furring

9.29.3.1. Size and Spacing of Furring

(1) Wood furring for the attachment of wall and ceiling finishes shall conform to Table 9.29.3.1.

Table 9.29.3.1.
Size and Spacing of Furring

Forming Part of Sentence 9.29.3.1.(1)

Column 1	Column 2	Column 3	Column 4
Maximum Spacing of Furring, mm	Minimum Size of Furring, mm		
	Maximum Spacing of Furring Supports		
	Continuous Supports	400 mm (o.c.)	600 mm (o.c.)
300	19 × 38	19 × 38	19 × 64
400	19 × 38	19 × 38	19 × 64
600	19 × 38	19 × 64	19 × 89

9.29.3.2. Fastening

(1) Furring shall be fastened to the framing or to wood blocks with not less than 51 mm nails.

9.29.4. Plastering

9.29.4.1. Application

(1) Application of plaster wall and ceiling finishes including installation of metal or gypsum lath, shall conform to CSA A82.30-M, "Interior Furring, Lathing and Gypsum Plastering".

9.29.5. Gypsum Board Finish (Taped Joints)

9.29.5.1. Application

(1) The requirements for application of gypsum board in this Subsection apply to the single layer application of gypsum board to wood furring or framing using nails or screws.

(2) Gypsum board applications not described in this Subsection shall conform to CSA A82.31-M, "Gypsum Board Application".

9.29.5.2. Materials

(1) Gypsum products shall conform to,

(a) CAN/CSA-A82.27-M, "Gypsum Board",

(b) ASTM C36 / C36M, "Gypsum Wallboard",

(c) ASTM C37 / C37M, "Gypsum Lath",

(d) ASTM C442 / C442M, "Gypsum Backing Board, and Gypsum Coreboard, and Gypsum Shaftliner Board",

(e) ASTM C558 / C588M, "Gypsum Base for Veneer Plaster",

(f) ASTM C630 / C630M, "Water-Resistant Gypsum Backing Board",

(g) ASTM C931 / C931M, "Exterior Gypsum Soffit Board",

(h) ASTM C960 / C960M, "Predecorated Gypsum Board",

(i) ASTM C1178 / C1178M, "Glass Mat Water-Resistant Gypsum Backing Panel",

(j) ASTM C1395 / C1395M, "Gypsum Ceiling Board", or

(k) ASTM C1396 / C1396M, "Gypsum Board".

9.29.5.3. Maximum Spacing of Supports

(1) Maximum spacing of supports for gypsum board applied as a single layer shall conform to Table 9.29.5.3.

Table 9.29.5.3.
Spacing of Supports for Gypsum Board

Forming Part of Sentence 9.29.5.3.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5
Thickness, mm	Orientation of Board to Framing	Maximum Spacing of Supports, mm o.c.		
		Walls	Ceilings	
			Painted Finish	Water-Based Texture Finish
Gypsum board conforming to Clauses 9.29.5.2.(1)(a) to (i) and (k)				
9.5	parallel	—	—	—
	perpendicular	400	400	—
12.7	parallel	600	400	—
	perpendicular	600	600	400
15.9	parallel	600	400	—
	perpendicular	600	600	600
Gypsum board conforming to Clause 9.29.5.2.(1)(j)				
12.7	parallel	600	400	—
	perpendicular	600	600	600

9.29.5.4. Support of Insulation

(1) Gypsum board supporting insulation shall be at least 12.7 mm thick.

9.29.5.5. Length of Fasteners

(1) The length of fasteners for gypsum board shall conform to Table 9.29.5.5., except that lesser depths of penetration are permitted for assemblies required to have a *fire-resistance rating* provided it can be shown, on the basis of fire tests, that such depths are adequate for the required rating.

Table 9.29.5.5.
Fastener Penetration into Wood Supports

Forming Part of Sentence 9.29.5.5.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5
Required *Fire-Resistance Rating* of Assembly	Minimum Penetration, mm			
	Walls		Ceilings	
	Nails	Screws	Nails	Screws
Not required	20	15	20	15
45 min	20	20	30	30

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5
Required *Fire-Resistance Rating* of Assembly	Minimum Penetration, mm			
	Walls		Ceilings	
	Nails	Screws	Nails	Screws
1 h	20	20	45	45
1.5 h	20	20	60	60

9.29.5.6. Nails

(1) Nails for fastening gypsum board to wood supports shall conform to CSA B111, "Wire Nails, Spikes and Staples".

9.29.5.7. Screws

(1) Screws for fastening gypsum board to wood supports shall conform to ASTM C1002, "Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs".

9.29.5.8. Spacing of Nails

(1) For single-layer application on ceilings, nails shall be spaced,

(a) not more than 180 mm o.c. on ceiling supports, or

(b) every 300 mm o.c. along ceiling supports, in pairs about 50 mm apart.

(2) Where the ceiling sheets are supported by the wall sheets around the perimeter of the ceiling, this support may be considered as equivalent to nailing at this location.

(3) Except as required by Sentence (4), for single-layer application on walls, nails shall be spaced,

(a) not more than 200 mm o.c. on vertical wall supports, or

(b) every 300 mm o.c. along vertical wall supports, in pairs about 50 mm apart.

(4) For single-layer application on walls, where gypsum board is required to provide bracing, lateral support or fire protection, nails shall be spaced not more than 200 mm o.c. on,

(a) vertical wall supports, and

(b) top and bottom plates.

(5) The uppermost nails on vertical wall supports shall be not more than 200 mm below the ceiling.

(6) Nails shall be located not less than 10 mm from the side or edge of the board.

(7) Nails shall be driven so that the heads do not puncture the paper.

9.29.5.9. Spacing of Screws

(1) For single-layer application on a ceiling, screws shall be spaced not more than 300 mm o.c. on ceiling supports.

(2) Where the ceiling sheets are supported by the wall sheets around the perimeter of the ceiling, this support may be considered as equivalent to screwing at this location.

(3) Except as required by Sentence (4), for single-layer application on walls, screws shall be spaced,

(a) not more than 300 mm o.c. on vertical wall supports where the supports are more than 400 mm o.c., or

(b) not more than 400 mm o.c. on vertical wall supports where the supports are not more than 400 mm o.c.

(4) Except as required by Sentence (5), for single-layer application on walls, where gypsum board is required to provide bracing, lateral support or fire protection, screws shall be spaced not more than 300 mm o.c. on,

(a) vertical wall supports, and

(b) top and bottom plates.

(5) Where a *fire-resistance rating* is determined based on Supplementary Standard SB-3, Sentence (4) need not apply for the purpose of fire protection.

(6) Screws shall be located not less than 10 mm from the side or edge of the board.

(7) Screws shall be driven so that the heads do not puncture the paper.

9.29.5.10. Low Temperature Conditions

(1) In cold weather, heat shall be provided to maintain a temperature of not below 10°C for 48 h prior to taping and finishing and maintained for not less than 48 h after that.

9.29.6. Plywood Finish

9.29.6.1. Thickness

(1) Except as provided in Sentences (2) and (3), the minimum thickness of plywood interior finish shall conform to Table 9.29.6.1.

Table 9.29.6.1.
Thickness of Plywood Interior Finish

Forming Part of Articles 9.29.6.1., 9.29.6.2. and 9.29.9.2.

COLUMN 1	COLUMN 2	COLUMN 3
Maximum Spacing of Supports, mm o.c.	Minimum Thickness, mm[1], on Supports with no Horizontal Blocking	Minimum Thickness, mm[1], on Supports with Blocking at Vertical Intervals not Exceeding 1.2 m
400	4.7	4.0
600	8.0	4.7

Notes to Table 9.29.6.1.

(1) Thickness limits shall apply to the net effective thickness (NET) of grooved, striated, textured and/or embossed panels and to the actual thickness of flat panels.

(2) A manufacturing tolerance of – 0.4 mm may be applied to the thicknesses listed in Table 9.29.6.1.

(3) No minimum thickness is required where plywood is applied over continuous backing.

9.29.6.2. Grooved Plywood

(1) Except as permitted in Sentence (2), where plywood for interior finish is grooved, the grooves shall not extend through the face ply and into the plies below the face ply unless the groove is supported by framing or furring.

(2) If the grain of the face ply is at right angles to the supporting members, the groove is permitted to extend into the plies below the face ply provided the thickness of the plywood exceeds the value shown in Table 9.29.6.1. by an amount equal to not less than the depth of penetration of the grooves into the plies below the face ply.

9.29.6.3. Nails and Staples

(1) Nails for attaching plywood finishes shall not be less than 38 mm casing or finishing nails spaced not more than 150 mm o.c. along edge supports and 300 mm o.c. along intermediate supports, except that staples providing equivalent lateral resistance may also be used.

9.29.6.4. Edge Support

(1) All plywood edges shall be supported by furring, blocking or framing.

9.29.7. Hardboard Finish

9.29.7.1. Material Standard

(1) Hardboard shall conform to CAN/CGSB-11.3-M, "Hardboard".

9.29.7.2. Thickness

(1) Hardboard shall be not less than,

(a) 3 mm thick where applied over continuous back-up,

(b) 6 mm thick where applied to supports spaced not more than 400 mm o.c., and

(c) 9 mm thick where applied to supports spaced not more than 600 mm o.c.

9.29.7.3. Nails

(1) Nails for fastening hardboard shall be casing or finishing nails not less than 38 mm long, spaced not more than 150 mm o.c. along edge supports and 300 mm o.c. along intermediate supports.

9.29.7.4. Edge Support

(1) All hardboard edges shall be supported by furring, blocking or framing where the back-up is not continuous.

9.29.8. Insulating Fibreboard Finish

9.29.8.1. Material Standard

(1) Insulating fibreboard shall conform to CAN/ULC-S706, "Wood Fibre Thermal Insulation for Buildings".

9.29.8.2. Thickness

(1) Insulating fibreboard sheets shall be not less than 11.1 mm thick on supports not more than 400 mm o.c.

(2) Insulating fibreboard tile shall be not less than 12.7 mm thick on supports spaced not more than 400 mm o.c.

9.29.8.3. Nails

(1) Nails for fastening fibreboard sheets shall be not less than 2.6 mm shank diameter casing or finishing nails of sufficient length to penetrate not less than 20 mm into the supports.

(2) Nails shall be spaced not more than 100 mm o.c. along edge supports and 200 mm o.c. along intermediate supports.

9.29.8.4. Edge Support

(1) All fibreboard edges shall be supported by blocking, furring or framing.

9.29.9. Particleboard, OSB or Waferboard Finish

9.29.9.1. Material Standard

(1) Particleboard finish shall conform to ANSI A208.1, "Particleboard, Mat-Formed Wood".

(2) OSB or waferboard finish shall conform to,

(a) CAN/CSA-O.325, "Construction Sheathing", or

(b) CSA O437.0, "OSB and Waferboard".

9.29.9.2. Minimum Thickness

(1) Except as provided in Sentences (2) and (3), the minimum thickness of O-2 grade OSB used as an interior finish shall conform to that shown for plywood in Table 9.29.6.1.

(2) Thickness listed in Table 9.29.6.1. shall permit a manufacturing tolerance of – 0.4 mm.

(3) No minimum thickness is required where O-2 grade OSB is applied over continuous backing.

(4) OSB conforming to O-1 grade, waferboard conforming to R-1 grade and particleboard shall be,

(a) not less than 6.35 mm thick on supports not more than 400 mm o.c.,

(b) not less than 9.5 mm thick on supports not more than 600 mm o.c., and

(c) not less than 6.35 mm thick on supports not more than 600 mm o.c. in walls where blocking is provided at midwall height.

(5) OSB conforming to CAN/CSA-O325.0, "Construction Sheathing", shall meet the minimum panel mark of,

(a) W16, on supports not more than 400 mm o.c.,

(b) W24, on supports not more than 600 mm o.c., and

(c) W16, on supports not more than 600 mm o.c. where blocking is provided at midwall height.

9.29.9.3. Nails

(1) Nails for fastening particleboard, OSB or waferboard shall be not less than 38 mm casing or finishing nails spaced not more than 150 mm o.c. along edge supports and 300 mm o.c. along intermediate supports.

9.29.9.4. Edge Support

(1) All particleboard, OSB or waferboard edges shall be supported by furring, blocking or framing.

9.29.10. Wall Tile Finish

9.29.10.1. Tile Application

(1) Ceramic tile shall be set in a mortar base or applied with an adhesive.

(2) Plastic tile shall be applied with an adhesive.

9.29.10.2. Mortar Base

(1) When ceramic tile is applied to a mortar base the cementitious material shall consist of 1 part Portland cement to not more than one-quarter part lime by volume.

(2) The cementitious material described in Sentence (1) shall be mixed with no fewer than 3 nor more than 5 parts of aggregate per part of cementitious material by volume.

(3) Mortar shall be applied over metal lath or masonry.

(4) Ceramic tile applied to a mortar base shall be thoroughly soaked and pressed into place forcing the mortar into the joints while the tile is wet.

9.29.10.3. Adhesives

(1) Adhesives to attach ceramic and plastic tile shall be applied to the finish coat or brown coat of plaster that has been steel-trowelled to an even surface or to gypsum board or to masonry provided the masonry has an even surface.

9.29.10.4. Moisture Resistant Backing

(1) Ceramic and plastic tile installed on walls around bathtubs or showers shall be applied over moisture resistant backing.

9.29.10.5. Joints between Tiles and Bathtub

(1) The joints between wall tiles and a bathtub or shower shall be suitably caulked with material conforming to CAN/CGSB-19.22-M, "Mildew Resistant Sealing Compound for Tubs and Tile".

Section 9.30. Flooring

9.30.1. General

9.30.1.1. Required Finish Flooring

(1) Finished flooring shall be provided in all *residential occupancies*.

9.30.1.2. Water Resistance

(1) Finished flooring in bathrooms, kitchens, public entrance halls, laundry and general storage areas shall consist of resilient flooring, felted-synthetic-fibre floor coverings, concrete, terrazzo, ceramic tile, mastic or other types of flooring providing similar degrees of water resistance.

9.30.1.3. Sleepers

(1) Wood sleepers supporting finished flooring over a concrete base supported on the ground shall be not less than 19 mm by 38 mm and shall be treated with a wood preservative.

9.30.1.4. Finish Quality

(1) Finished flooring shall have a surface that is smooth, even and free from roughness or open defects.

9.30.2. Panel-Type Underlay

9.30.2.1. Required Underlay

(1) A panel-type underlay shall be provided under resilient flooring, parquet flooring, ceramic tile, felted-synthetic-fibre floor coverings or carpeting laid over lumber subflooring.

(2) A panel-type underlay shall be provided under resilient flooring, parquet flooring, felted-synthetic-fibre floor coverings or carpeting on panel-type subflooring whose edges are unsupported.

(3) Panel-type underlay shall be provided under ceramic tile applied with adhesive.

(4) Panel-type underlay shall be provided under resilient flooring on waferboard or strandboard subflooring.

9.30.2.2. Materials and Thickness

(1) Panel-type underlay shall be not less than 6 mm thick and shall conform to,

(a) ANSI A208.1, "Particleboard, Mat-Formed Wood",

(b) CAN/CGSB-11.3-M, "Hardboard",

(c) CSA O115-M, "Hardwood and Decorative Plywood",

(d) CSA O121-M, "Douglas Fir Plywood",

(e) CSA O151, "Canadian Softwood Plywood",

(f) CSA O153-M, "Poplar Plywood", or

(g) CSA O437.0, "OSB and Waferboard".

9.30.2.3. Fastening

(1) Panel-type underlay shall be fastened to the subfloor with staples, annular grooved flooring nails or spiral nails, spaced not more than 150 mm o.c. along the edges and 200 mm o.c. both ways at other locations.

(2) Nails for panel-type underlay shall be not less than 19 mm long for 6 mm thick underlay and 22 mm long for 7.9 mm thick underlay.

(3) Staples for panel-type underlay shall,

(a) have not less than a 1.2 mm shank diameter or thickness with a 4.7 mm crown, and

(b) be not less than,

(i) 22 mm long for 6 mm underlay, and

(ii) 28 mm long for 7.9 mm and 9.5 mm underlay.

9.30.2.4. Joints Offset

(1) Where panel-type underlay is required to be installed over plywood, or OSB or waferboard, the joints in the underlay shall be offset at least 200 mm from the joints in the underlying subfloor.

9.30.2.5. Surface Defects

(1) Underlay beneath resilient or ceramic floors applied with an adhesive shall have all holes or open defects on the surface patched so that the defects will not be transmitted to the finished surface.

9.30.3. Wood Strip Flooring

9.30.3.1. Thickness

(1) The thickness of wood strip flooring shall conform to Table 9.30.3.1.

Table 9.30.3.1.
Thickness of Wood Strip Flooring

Forming Part of Sentence 9.30.3.1.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
Type of Flooring	Maximum Joist Spacing, mm	Minimum Thickness of Flooring, mm	
		With Subfloor	No Subfloor
Matched hardwood (interior use only)	400	7.9	19.0
	600	7.9	33.3
Matched softwood (interior or exterior use)	400	19.0	19.0
	600	19.0	31.7
Square edge softwood (exterior use only)	400	—	25.4
	600	—	38.1

9.30.3.2. Strip Direction and End Joints

(1) Wood strip flooring shall not be laid parallel to lumber subflooring unless a separate underlay is provided.

(2) If wood strip flooring is applied without a subfloor, it shall be laid at right angles to the joists so that the end joints are staggered and occur over supports or are end matched.

(3) If the flooring is end matched, it shall be laid so that no 2 adjoining strips break joints in the same space between supports and each strip bears on no fewer than 2 supports.

9.30.3.3. Nailing

(1) When nails are used, wood strip flooring shall be toe nailed or face nailed with at least 1 nail per strip at the spacings shown in Table 9.30.3.3., except that face nailed strips of more than 25 mm in width shall have at least 2 nails per strip.

(2) Face nails shall be countersunk.

Table 9.30.3.3.
Nailing of Wood Strip Flooring

Forming Part of Sentence 9.30.3.3.(1)

COLUMN 1	COLUMN 2	COLUMN 3
Finish Floor Thickness, Mm	Minimum Length of Flooring Nails, mm	Maximum Spacing of Flooring Nails, mm
7.9	38(1)	200
11.1	51	300
19.0	57	400
25.4	63	400
31.7	70	600
38.1	83	600

Notes to Table 9.30.3.3.:

(1) See Article 9.30.3.4.

9.30.3.4. Staples

(1) Staples are permitted to be used to fasten wood strip flooring not more than 7.9 mm in thickness and not more than 50 mm in width provided the staples,

(a) are not less than 29 mm long,

(b) have a shank diameter of not less than 1.19 mm,

(c) have a crown of not less than 4.7 mm, and

(d) are spaced not more than 400 mm o.c.

(2) Staples are permitted to be used to fasten wood strip flooring not more than 19 mm in thickness and not more than 83 mm in width provided the staples,

(a) are not less than 51 mm long,

(b) have a shank diameter of not less than 1.82 mm,

(c) have a crown of not less than 12.7 mm, and

(d) are spaced not more than 400 mm o.c.

9.30.4. Parquet Flooring

9.30.4.1. Adhesive

(1) Adhesive used to attach parquet block flooring shall be suitable for bonding wood to the applicable subfloor material.

9.30.5. Resilient Flooring

9.30.5.1. Materials

(1) Resilient flooring used on concrete slabs supported on ground shall consist of asphalt, rubber, vinyl-asbestos, unbacked vinyl or vinyl with an inorganic type backing.

(2) Flooring described in Sentence (1) shall be attached to the base with a suitable waterproof and alkali-resistant adhesive.

9.30.6. Ceramic Tile

9.30.6.1. Application

(1) Ceramic tile shall be set in a mortar bed or applied to a sound smooth base with a suitable adhesive.

(2) Panel-type subfloor to which ceramic tile is to be applied with adhesive shall have its edges supported according to Article 9.23.14.3.

9.30.6.2. Ceramic Tile Set in Mortar Bed

(1) When ceramic tile is set in mortar bed, the bed shall be not less than 32 mm thick. A 50 mm by 50 mm galvanized wire mesh shall be placed in the mortar bed, and asphalt sheathing paper, felt or polyethylene film shall be applied under the mortar bed when the mortar is applied over wood subfloors.

(2) The mortar bed described in Sentence (1) shall consist of by volume,

(a) 1 part Portland cement,

(b) 4 parts sand, and

(c) 1 part water.

(3) The tile joints for the ceramic tile in Sentence (1) shall be grouted with cement grout which shall be compressed into joints between the tiles and then wiped smooth.

9.30.6.3. Reinforcement for Panel-Type Wood Sheathing

(1) Except as permitted in Article 9.30.6.4., when ceramic floor tiles are set on panel-type wood sheathing, one of the following assemblies for reinforcing the floor assembly shall be used:

(a) 20 mm thick plywood or waferboard with all edges supported by at least 38 mm by 38 mm blocking with floor joists spaced not more than 400 mm o.c., with 6 mm underlay,

(b) sheathing with a thickness that conforms to Table 9.23.14.5.A. or a rating that complies to Table 9.23.14.5.B. and has an underlay consisting of 15.9 mm plywood or waferboard with offsetting joints, with a 4 mm gap between the sheets, or

(c) subfloor sheathing reinforced with close spaced 38 mm by 38 mm blocking at spacings at least half that of the floor joist spacing.

9.30.6.4. Ceramic Tile Applied to Mortar Bed with Adhesive

(1) When ceramic tile is applied to a mortar bed with adhesive, the bed shall be not less than 12.5 mm thick.

(2) The mortar bed described in Sentence (1) shall consist of by volume,

(a) 1 part Portland cement,

(b) 3 parts sand, and

(c) 1 part water.

(3) At least one layer of galvanized diamond mesh wire lath shall be imbedded in the mortar bed.

(4) Joints in the wire lath required by Sentence (3) shall be overlapped not less than 12 mm.

(5) The wire lath required in Sentence (3) shall be fastened to the subfloor with,

(a) lath nails not less than 38 mm length spaced not more than 150 mm o.c., or

(b) staples not less than 38 mm in length spaced not more than 150 mm o.c.

(6) Asphalt sheathing paper, felt or polyethylene film shall be applied between the mortar bed and the wood subfloor.

(7) Floor joists supporting the mortar bed described in Sentence (1) shall,

(a) be spaced not more than 400 mm o.c., and

(b) have no fewer than two rows of 38 mm × 38 mm cross bridging.

(8) The tile joints for the ceramic tile in Sentence (1) shall be grouted with cement grout which shall be compressed into joints between the tiles and then wiped smooth.

Section 9.31. Plumbing Facilities

9.31.1. Scope

9.31.1.1. Application

(1) Except as provided in Sentence (2), this Section applies to *plumbing* facilities and *plumbing systems* serving *dwelling units*.

(2) *Plumbing* facilities, grab bars, floor drains and floor and wall finishes around urinals shall conform to Subsection 3.7.4. and Article 7.1.5.2. in,

(a) a *recreational camp*,

(b) a *camp for housing of workers*, or

(c) all other *buildings* not described in Sentence (1).

(3) Medical gas piping systems shall conform to Subsection 3.7.5.

9.31.2. General

9.31.2.1. General

(1) The *construction* of *plumbing systems* shall conform to Part 7.

9.31.2.2. Corrosion Protection

(1) Metal pipes in contact with cinders or other corrosive material shall be protected by a heavy coating of bitumen or other corrosion protection.

9.31.2.3. Grab Bars

(1) When provided, grab bars shall be capable of resisting a load of not less than 1.3 kN applied vertically or horizontally.

9.31.3. Water Supply and Distribution

9.31.3.1. Reserved

9.31.3.2. Required Connections

(1) In a *dwelling unit* with a *water distribution system*, piping for hot and cold water shall be connected to every kitchen sink, lavatory, bathtub, shower, slop sink and laundry area.

(2) Piping for cold water shall be run to every water closet.

9.31.4. Required Facilities

9.31.4.1. Required Fixtures

(1) In a *dwelling unit* with a *water distribution system*, a kitchen sink, lavatory, bathtub or shower stall and water closet shall be provided.

9.31.4.2. Laundry Fixtures

(1) Laundry facilities or a space for laundry facilities shall be provided in every *dwelling unit* or grouped elsewhere in the *building* in a location conveniently accessible to occupants of every *dwelling unit.*

9.31.4.3. Hot Water Supply

(1) In a *dwelling unit* with a *water distribution system*, a hot water supply shall be provided.

(2) A *water distribution system* supplying hot water to *plumbing fixtures* shall conform to the requirements in Subsection 7.6.5.

9.31.4.4. Floor Drains

(1) A floor drain shall be installed in a *basement* forming part of a *dwelling unit.*

9.31.5. Reserved

9.31.6. Service Water Heating Facilities

9.31.6.1. Hot Water Temperature

(1) Where a hot water supply is required by Article 9.31.4.3., equipment shall be installed to provide to every *dwelling unit* an adequate supply of service hot water with a temperature range from 45°C to 60°C.

9.31.6.2. Equipment and Installation

(1) Every *service water heater* and its installation shall conform to Part 7.

(2) Reserved

(3) Where the *building* is in a location where the spectral response acceleration, $S_a(0.2)$, is greater than 0.55, *service water heaters* shall be secured to the structure to resist overturning and displacement.

9.31.6.3. Corrosion-Resistant Coating

(1) Where storage tanks for *service water heaters* are steel, they shall be coated with zinc, vitreous enamel (glass lined), hydraulic cement or other corrosion-resistant material.

9.31.6.4. Fuel-Burning Heaters

(1) Fuel-burning *service water heaters* shall be connected to a *chimney flue* conforming to Section 9.21.

9.31.6.5. Heating Coils

(1) Heating coils of *service water heaters* shall not be installed in a *flue* or in the combustion chamber of a *boiler* or furnace heating a *building.*

Section 9.32. Ventilation

9.32.1. General

9.32.1.1. Application

(1) This Section applies to the ventilation of rooms and spaces in *residential occupancies* by natural ventilation and to self-contained mechanical ventilation systems serving only one *dwelling unit.*

(2) Mechanical ventilation systems, other than self-contained systems serving single *dwelling units*, shall conform to Part 6.

(3) Ventilation of rooms and spaces in other than *residential occupancies* shall conform to Part 6.

(4) A *storage garage* for more than 5 cars shall be ventilated in accordance with Part 6.

(5) A clothes dryer exhaust duct system shall conform to Part 6.

9.32.1.2. Mechanical Ventilation for Dwelling Units

(1) Every *dwelling unit* that is supplied with electrical power shall be provided with a mechanical ventilation system in accordance with Subsection 9.32.3.

9.32.1.3. Ventilation of Rooms and Spaces

(1) Except as permitted in Sentence (2), rooms or spaces in *a dwelling unit* shall be ventilated by natural means in accordance with Subsection 9.32.2.

(2) The natural ventilation of rooms or spaces required in Sentence (1) may be provided by mechanical means.

(3) Where a room or space is not provided with natural ventilation as described in Sentence (1), mechanical ventilation shall be provided to exhaust inside air from or to introduce outside air to that room or space at the rate of one-half air change per hour if the room or space is mechanically cooled in summer, and one air change per hour if it is not.

9.32.2. Natural Ventilation

9.32.2.1. Natural Ventilation Area

(1) The unobstructed openable ventilation area to the outdoors for rooms and spaces in residential *buildings* ventilated by natural means shall conform to Table 9.32.2.1.

Table 9.32.2.1.
Natural Ventilation

Forming Part of Sentence 9.32.2.1.(1)

COLUMN 1	COLUMN 2	COLUMN 3
Location		Minimum Unobstructed Area
Within a *dwelling unit*	Bathrooms or water closet rooms	0.09 m²
	Unfinished *basement* space	0.2 per cent of the floor area
	Dining rooms, living rooms, bedrooms, kitchens, combined rooms, dens, recreation rooms and all other finished rooms	0.28 m² per room or combination of rooms
Other than within a *dwelling unit*	Bathrooms or water closet rooms	0.09 m² per water closet
	Sleeping areas	0.14 m² per occupant
	Laundry rooms, kitchens, recreation rooms	4 per cent of the floor area
	Corridors, storage rooms and other similar public rooms or spaces	2 per cent of the floor area
	Unfinished *basement* space not used on a shared basis	0.2 per cent of the floor area

(2) Where a vestibule opens directly off a living or dining room within a *dwelling unit*, ventilation to the outdoors for such rooms may be through the vestibule.

9.32.2.2. Protection from Weather and Insects

(1) Openings for natural ventilation other than windows shall be constructed to provide protection from the weather and insects.

(2) Screening shall be of rust-proof material.

9.32.3. Mechanical Ventilation

9.32.3.1. General

(1) For the purposes of this Subsection a non-solid fuel-fired *appliance* shall be classified as,

(a) direct vented whereby the combustion air is supplied directly from the outdoors to the combustion chamber via a sealed passageway, and the products of combustion are exhausted directly outdoors through an independent sealed vent,

(b) mechanically vented induced draft whereby combustion air is supplied from within the *building* envelope and the products of combustion are positively conveyed to the outdoors by means of a dedicated sealed vent, or

(c) natural draft whereby combustion air is supplied from within the *building* envelope and the products of combustion are conveyed to the outdoors through a *chimney* or Type B vent.

(2) For the purposes of this Subsection a *dwelling unit* shall be categorized as,

(a) Type I when,

  (i) all fuel-fired combustion *appliances* located in the *dwelling unit* are direct vented or except for fireplaces, are mechanically vented induced draft, and

  (ii) the *dwelling unit* does not contain a solid fuel-fired combustion *appliance*,

(b) Type II when a solid fuel-fired combustion *appliance* is installed in a Type I *dwelling unit*,

(c) Type III when a mechanically vented induced draft non-solid fuel-fired fireplace or a natural draft *appliance* is present, or

(d) Type IV when *electric space heating* is present.

9.32.3.2. Required Mechanical Ventilation

(1) The mechanical ventilation system required in Article 9.32.1.2. shall comply with,

(a) Part 6, or

(b) this Subsection for a mechanical ventilation system in a Type I, Type II or Type IV *dwelling unit*.

9.32.3.3. Total Ventilation Capacity

(1) The minimum total ventilation capacity of the ventilation system required in Clauses 9.32.3.2.(1)(b) shall be the sum of the individual room capacities given in Table 9.32.3.3.

Table 9.32.3.3.
Ventilation Capacity

Forming Part of Sentence 9.32.3.3.(1)

COLUMN 1	COLUMN 2
Room	Capacity, L/s
Master bedroom(1)	10
Other bedrooms	5
Living room(2)	5
Dining room(2)	5
Kitchen	5
Family room(2)	5
Recreation room	5
Basement(3)	10
Other habitable rooms(4)	5
Bathroom or water closet room	5
Laundry room	5
Utility room	5

Notes to Table 9.32.3.3.:

(1) At least one bedroom in each *dwelling unit* shall be designated as the master bedroom.

(2) Ventilation capacities assigned to any combined living/dining or family/dining space shall be determined as if the spaces were individual rooms.

(3) Where a *basement* incorporates rooms of the types designated in this Table, the assigned ventilation capacities for each room shall be as specified for those types of rooms. *Basement* areas used for other purposes that exceed ⅔ of the total *basement* floor area shall be assigned a fan capacity of 10 L/s. Those that are less than ⅔ of the total floor area shall be assigned 5 L/s.

(4) Other habitable rooms shall be assigned a ventilation capacity of 5 L/s. This does not include spaces intended solely for access, egress, storage or service equipment.

9.32.3.4. Principal Exhaust

(1) A principal exhaust fan shall be installed and shall be rated to provide not less than the capacity given in Table 9.32.3.4.A.

Table 9.32.3.4.A.
Principal Exhaust Fan Capacity

Forming Part of Sentence 9.32.3.4.(1)

COLUMN 1	COLUMN 2
Number of Bedrooms in *Dwelling Unit*	Capacity, L/s
1	15
2	22.5
3	30
4	37.5
More than 4	Part 6 design

(2) Except as permitted in Sentence (3), the principal exhaust fan shall be controlled by a manual switch.

(3) A principal exhaust fan required under this Article may be controlled by a dehumidistat or other automatic control device where the manual switch required in Sentence (2) is capable of activating the fan regardless of the setting of the automatic control.

(4) The switches required in Sentences (2) and (3) shall be centrally located in the *dwelling unit* and shall be identified with the words **VENTILATION FAN**.

(5) The principal exhaust required in this Article may be provided by means of a heat recovery ventilator installed in accordance with Article 9.32.3.11.

(6) Where the installed capacity of the principal exhaust fan exceeds the minimum capacity required in Sentence (1) by more than 50%, the control required in Sentence (2) shall include provision to allow reduction of the flow to within ±10% of the minimum capacity specified in Sentence (1).

(7) Where an exhaust air intake for the principal exhaust fan is connected directly to the duct system of a forced air heating system or other central air circulating system, it shall,

(a) be connected to the return air side of the system, and

(b) be connected not less than 1 000 mm upstream from any outdoor air supply duct.

(8) Where an exhaust air intake for the principal exhaust fan is located in the kitchen, it shall be located in the ceiling or on the wall within 300 mm of the ceiling.

(9) Single or multiple *exhaust ducts* serving the principal exhaust fan required by Sentence (1) shall be sized according to Part 6 except that they may be sized according to Table 9.32.3.4.B. where

(a) the longest total duct length, from intake grille to outdoor hood, does not exceed 12 m, and

(b) the number of elbows does not exceed 4, but, in any case, they shall not be smaller than recommended by the manufacturer of the fan.

Table 9.32.3.4.B.
Principal Exhaust Duct Size

Forming Part of Sentence 9.32.3.4.(9)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5
Number of Bedrooms in *Dwelling Unit*	Minimum *Exhaust Duct* Diameter			
	Ducts Connected to Inlet and Outlet of Principal Exhaust Fan		Ducts Connected to One Side Only of Principal Exhaust Fan	
	Smooth Duct, mm	Flexible Duct, mm	Smooth Duct, mm	Flexible Duct, mm
1	100	125	100	125
2	125	150	125	150
3	125	150	150	175
4	150	175	150	175
More than 4	Part 6 design	Part 6 design	Part 6 design	Part 6 design

(10) In applying Table 9.32.3.4.B.,

(a) where there is more than one exhaust air inlet duct connected directly to the fan, the diameter of the inlet ducts may be decreased by 25 mm, and

(b) where the *exhaust duct* is connected to the duct system of a forced air heating system, the duct diameter shall be increased by 25 mm.

9.32.3.5. Supplemental Exhaust

(1) Additional supplemental exhaust capacity shall be installed as necessary so that the total capacity of all kitchen, bathroom, water closet room and other supplemental exhaust air intakes is not less than the total ventilation capacity, as required in Article 9.32.3.3., minus the principal exhaust fan capacity, as required in Article 9.32.3.4.

(2) An exhaust air intake shall be installed in each kitchen, bathroom and water closet room.

(3) Where the intake for a supplemental exhaust fan other than a range hood or range-top fan is installed in a kitchen, it shall be installed in the ceiling or on the wall within 300 mm of the ceiling.

(4) *Exhaust ducts* serving the required kitchen, bathroom, water closet room and other supplemental exhaust air intakes shall be sized according to Part 6 except that they may be sized according to Table 9.32.3.5. where

(a) the total duct length does not exceed 9 m, and

(b) the number of elbows does not exceed 4, but, in any case, they shall not be smaller than recommended by the manufacturers of the fans.

Table 9.32.3.5.
Kitchen, Bathroom and Water Closet Room Exhaust Duct Size

Forming Part of Sentence 9.32.3.5.(4)

COLUMN 1	COLUMN 2	COLUMN 3
Fan Capacity, L/s	Minimum *Exhaust Duct* Diameter(1)	
	Ducts Connected to Inlet and Outlet of Exhaust Fan, mm	Ducts Connected to One Side Only of Exhaust Fan, mm
25	125	125
50	150	150

Notes to Table 9.32.3.5.:

(1) Where flexible duct is used, the duct diameter shall be increased by 25 mm.

(5) A supplemental exhaust fan required by this Article shall be controlled by a manual switch located in the room served by the exhaust fan.

(6) Where the supplemental exhaust is provided by an exhaust fan serving multiple exhaust air intakes required in rooms described in Sentence (2), the exhaust fan shall be controlled by a manual switch located in each room served by that exhaust fan and wired in parallel.

(7) Where the supplemental exhaust is provided by a principal exhaust fan serving multiple exhaust air intakes required in rooms described in Sentence (2), the principal exhaust fan shall be controlled by a manual switch located in each room served by that exhaust fan and wired in parallel with the manual switch required in Sentence 9.32.3.4.(5).

(8) Where a supplemental fan required by this Article is controlled by a dehumidistat or other automatic control in addition to the manual switch required by Sentences (5) to (7), the manual switch shall be capable of activating the fan regardless of the setting of the automatic control.

(9) Supplemental exhaust required in this Article may be provided by means of a heat recovery ventilator installed in accordance with Article 9.32.3.11.

9.32.3.6. Ventilation Systems Coupled with Forced Air Heating Systems

(1) This Article applies to a mechanical ventilation system in a *dwelling unit* that contains a forced air heating system and the forced air heating system is used for delivery of ventilation air.

(2) In a Type I *dwelling unit*, a ventilation supply inlet is not required.

(3) In a Type II *dwelling unit*, the mechanical ventilation system shall include a heat recovery ventilator, coupled to the forced air heating system, installed in accordance with Article 9.32.3.11.

(4) The forced air heating system circulation fan shall be controlled by a manual switch located adjacent to the ventilation fan switch required in Sentence 9.32.3.4.(4).

(5) The switch required in Sentence (4) shall be identified by the words **CIRCULATION FAN**.

9.32.3.7. Ventilation Systems Not Coupled with Forced Air Heating Systems

(1) This Article applies to a mechanical ventilation system in a *dwelling unit* that,

(a) does not contains a forced air heating system, or

(b) contains a forced air heating system and the forced air heating system is not used for circulation of the ventilation air.

(2) The mechanical ventilation system shall introduce air to and circulate air throughout the *dwelling unit* in compliance with this Article.

(3) The mechanical system in this Article shall include a heat recovery ventilator installed in accordance with Article 9.32.3.11.

(4) Outdoor air shall be distributed by a ductwork system from the heat recovery ventilator required in Sentence (3) to each bedroom, to any *storey* without a bedroom and, if there is no *storey* without a bedroom, to the principal living area.

(5) A *supply duct* from the outdoors to the heat recovery ventilator required and a main distribution trunk duct shall be provided and shall be sized according to Part 6, except that, the *supply duct* and the main distribution trunk duct may be sized according to Table 9.32.3.7.A. where,

(a) the total duct length from the outdoor hood to any supply register does not exceed 21 m, and

(b) the total number of fittings does not exceed 8.

(6) The outside air *supply duct* required by Sentence (5) shall not be considered to provide combustion and/or dilution air to fuel-burning *appliances*.

Table 9.32.3.7.A.
Minimum Outdoor Air Supply and Main Trunk Duct Sizes

Forming Part of Sentence 9.32.3.7.(5)

COLUMN 1	COLUMN 2
Number of Bedrooms in *Dwelling Unit*	Minimum Outdoor Air Supply and Main Distribution Trunk Duct Diameter, mm
1	150
2	150
3	175
4	175
More than 4	Part 6 design

(7) Branch *supply ducts* leading from the main distribution trunk duct required by Sentence (5) to the rooms to which outdoor air is to be distributed shall be provided and shall be sized according to Part 6 except that the branch *supply ducts* may be sized according to Table 9.32.3.7.B. where,

(a) the total duct length from outdoor hood to supply register does not exceed 21 m, and

(b) the total number of fittings does not exceed 8.

Table 9.32.3.7.B.
Minimum Branch Supply Duct Sizes

Forming Part of Sentence 9.32.3.7.(7)

COLUMN 1	COLUMN 2	COLUMN 3
Room, Space or *Storey* Served	Minimum Branch *Supply Duct* Diameter, mm	
	1 and 2 Bedroom *Dwelling Units*	3 and 4 Bedroom *Dwelling Units*
Master bedroom	10	100
Other bedrooms	75	75
Storey with no bedrooms or living area	75	100

(8) In applying Sentence (7), where the *dwelling unit* has more than 4 bedrooms, ducting shall be sized according to Part 6.

(9) All branch *supply ducts* that are not fitted with diffusers with adjustable balance stops shall be supplied with accessible dampers that can be adjusted and fixed in their adjusted positions and that include devices to indicate the positions of the dampers.

(10) Provision shall be made for the free flow of air to all rooms by leaving gaps beneath doors, using louvred doors or installing grilles in doors.

9.32.3.8. Protection Against Depressurization

(1) When determining the need to provide protection against depressurization, consideration must be given to,

(a) whether the presence of *soil* gas is deemed to be a problem, and

(b) the presence of solid fuel-fired combustion *appliances*.

(2) Where a solid fuel-fired combustion *appliance* is installed, the ventilation system shall include a heat recovery ventilator that is designed to operate so that the flow of exhaust air does not exceed the flow of intake air in any operating mode, and that complies with the requirements of Article 9.32.3.11.

9.32.3.9. Fan Ratings

(1) Except as provided in Sentence (4), capacity ratings for required fans shall be determined in accordance with,

(a) CAN/CSA-C260-M, "Rating the Performance of Residential Mechanical Ventilating Equipment", or

(b) HVI 916, "Airflow Test Procedure".

(2) Sound ratings for required fans shall be determined in accordance with,

(a) CAN/CSA-C260-M, "Rating the Performance of Residential Mechanical Ventilating Equipment", or

(b) HVI 915, "Procedure for Loudness Rating of Residential Fan Products".

(3) Capacity ratings for required fans shall be based on a static pressure differential of 50 Pa, 25 Pa or 7.5 Pa depending on whether the fan is installed with ductwork connected on both sides, one side or neither side, respectively.

(4) Except for heat recovery ventilators, exhaust fans required to make up any part of the total ventilation capacity required by Article 9.32.3.3. shall have a sound rating not greater than that specified in Table 9.32.3.9.

Table 9.32.3.9.
Fan Sound Rating

Forming Part of Sentence 9.32.3.9.(4)

COLUMN 1	COLUMN 2	COLUMN 3
Fan Application	Maximum Sound Rating, sones	
	Rated according to CAN/CSA-C260-M	Rated according to HVI 915
Principal exhaust fan	2.0	2.5
Supplemental exhaust fans installed in bathrooms and water closet rooms and their make-up air fans	2.5	3.5
Supplemental exhaust fans installed in kitchens and their make-up air fans	no rating required	no rating required

(5) Required fans shall be installed according to the manufacturer's instructions.

(6) Mechanical ventilation devices shall conform to CSA C22.2 No. 113-M, "Fans and Ventilators".

9.32.3.10. Ducts

(1) Ventilation ducts shall conform to the requirements of Part 6 for *supply ducts* except that *exhaust ducts* that serve only a bathroom or water closet room may be of *combustible* material provided the duct is reasonably airtight and constructed of a material impervious to water.

(2) *Exhaust ducts* shall not discharge into heated or unheated enclosed spaces.

(3) Where an *exhaust duct* passes through or is adjacent to unheated space, the duct shall be insulated to not less than RSI 0.5.

(4) Where a *supply duct* carrying outdoor air that is not tempered or not mixed with indoor air passes through heated space, it shall be insulated to not less than RSI 0.5 except that, where such a duct is exposed in the heated space for more than 3 m of length in the heated space, it shall be insulated to not less than the values listed in Table 9.32.3.10.A.

Table 9.32.3.10.A.
Insulation of Fresh Air Supply Ducts

Forming Part of Sentence 9.32.3.10.(4)

COLUMN 1	COLUMN 2
Outside Winter Design Temperature as per Supplementary Standard SB-1(1), °C	Minimum Thermal Resistance, RSI
−7 to −11	0.5
−12 to −17	0.9
−18 to −24	1.2
−25 to −29	1.4
−30 to −34	1.8
−35 and colder	2.1

Notes to Table 9.32.3.10.A.:

(1) The outside winter design temperatures shall be those listed for the January 2.5 percent values.

(5) A kitchen *exhaust duct* not equipped with a filter at the inlet end shall be designed and installed so that the entire duct can be cleaned.

(6) Ductwork for range hoods and range-top fans shall be of *noncombustible*, corrosion-resistant material and shall lead directly to the outdoors without connection to other exhaust fans or ducts.

(7) Ductwork for range hoods and range-top fans shall be equipped with a grease filter at the intake.

(8) All ductwork shall be permanently supported or clipped to prevent sagging, excessive movement and vibration.

(9) All ducting connected to supply and exhaust fans shall be constructed so as to inhibit air leakage at joints.

(10) Where rectangular duct is used in place of round duct, it shall be selected according to Table 9.32.3.10.B.

Table 9.32.3.10.B.
Equivalent Duct Sizes

Forming Part of Sentence 9.32.3.10.(10)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5
Required Round Duct Size, mm	Permitted Equivalent Rectangular Duct Size, mm			
	Stack Duct	100 mm Depth	125 mm Depth	150 mm Depth
75	82 X 250	57 X 100		
100	82 X 250	89 X 100	75 X 125	75 X 150
125	82 X 250	125 X 100	100 X 125	89 X 150
150	82 X 300	200 X 100	150 X 125	125 X 150
175	82 X 350	275 X 100	200 X 125	175 X 150
More than 175	Part 6 design	Part 6 design	Part 6 design	Part 6 design

9.32.3.11. Heat Recovery Ventilators

(1) Where a heat recovery ventilator is installed to provide all or part of the requirements of this Subsection, this Article shall apply.

(2) Heat recovery ventilators shall be designed to provide a minimum 55% sensible heat recovery efficiency when tested to the low temperature thermal and ventilation performance test method set out in CAN/CSA-C439, "Rating the Performance of Heat/Energy-Recovery Ventilators", at a Station 1 test temperature of -25°C at an air flow not less than 30 L/s.

(3) Where a heat recovery ventilator is connected to a forced air heating system, the supply side of the ventilator shall be directly connected to the return air side of the forced air heating system.

(4) Two or more heat recovery ventilators shall not be connected in parallel air flow to a common air *supply duct* unless specifically recommended by the manufacturer.

(5) Two or more heat recovery ventilators shall not be connected in parallel air flow to a common downstream *exhaust duct*.

(6) Heat recovery ventilators installed in unheated spaces shall be installed so as to avoid condensation of moisture on fans and motors in exhaust air, in accordance with the manufacturer's instructions.

(7) All start-up procedures recommended by the manufacturer including air balancing and air-flow determination shall be followed.

(8) Free flow of condensate shall be provided in accordance with the manufacturer's recommendations or, in their absence, a condensate drain of minimum ½ inch nominal pipe size pitched in the direction of flow and complete with a trap or condensate pump with sufficient capacity shall be installed.

(9) The heat recovery ventilator and all condensate lines shall be installed in a space where the ambient temperature will not adversely affect the operation of the system.

(10) When operating at the rate required in Article 9.32.3.4., the supply and exhaust airflow rates of the heat recovery ventilator shall be balanced so that the value of the lesser flow shall be at least 90% of the value of the greater flow, unless otherwise recommended by the manufacturer.

9.32.3.12. Outdoor Intake and Exhaust Openings

(1) Separate air intake and exhaust outlet openings, when located on the same wall or roof, shall be installed so as to avoid contamination of the ventilation air by the exhaust air.

(2) Intake openings shall be located so as to avoid contamination of the ventilation air from other local sources such as automobile exhausts and exhaust from adjacent *buildings*.

(3) The distance from the bottom of an air intake opening to finished ground level or to any nearer and lower permanent horizontal surface shall be not less than 450 mm or the depth of expected snow accumulation, whichever is greater.

(4) The distance separating air intakes from *building* envelope penetrations that are potential sources of contaminants, such as *gas vents* or oil fill pipes, shall be not less than 900 mm.

(5) Air intakes shall be clearly labelled as such for identification from locations outside the *dwelling unit*.

(6) The distance from the bottom of an exhaust outlet to finished ground level or to any nearer and lower permanent horizontal surface shall be not less than 100 mm.

(7) Where air intake and exhaust openings are in exposed locations, provision shall be made to protect them from the entry of precipitation by the use of louvres, weather cowls or other suitable protection.

(8) Air intake openings shall incorporate screens or grilles to protect against the entry of animals and insects.

(9) Except for exhaust outlets serving heat recovery ventilators, exhaust outlets shall incorporate backdraft dampers.

(10) Except for clothes dryers, exhaust outlets shall be fitted with screens of mesh not larger than 15 mm, except where climatic conditions may require larger openings.

(11) Where a screen or grille required by Sentences (8) and (10) has a screen mesh less than 6 mm, the screen or grille shall be removable for cleaning.

(12) The gross area of the screens or grilles installed in intake and exhaust openings shall be three times that of the duct served.

(13) Screens and grilles shall be of corrosion-resistant material.

(14) The net free area of an air intake or exhaust outlet shall be equal to or greater than the cross-sectional area of the duct served.

9.32.3.13. Installation

(1) Installation of fans and heat recovery ventilators shall be in accordance with manufacturer's instructions for minimizing noise and vibration transmission and achieving the required sound rating.

(2) Where flow-regulating dampers are required, they shall be adjustable and accessible without requiring the removal of fans, motors, or insulating materials and without the need for specialized tools.

(3) Ventilation equipment shall be accessible for inspection, maintenance, repair and cleaning.

(4) Ventilation equipment installed in unheated spaces shall be installed so as to avoid condensation of moisture on fans and motors in accordance with the manufacturer's instructions.

Section 9.33. Heating and Air-Conditioning

9.33.1. General

9.33.1.1. Design and Installation Requirements

(1) The design and installation of central heating systems including requirements for combustion air, shall conform to the requirements in Part 6 and to this Section.

(2) The design and installation of *air-conditioning* systems shall conform to Part 6.

(3) Repairs, adjustments or component replacements that change the capacity or extent of safety of an existing heating, ventilating or *air-conditioning* system and that alter the method of operation shall conform to this Code.

9.33.1.2. Solid Fuel-Burning Appliances

(1) The design, construction and installation, including the provision of combustion air, of solid-fuel burning *appliances* and equipment, including *stoves, ranges* and *space heaters*, shall conform to CAN/CSA-B365-M, "Installation Code for Solid-Fuel-Burning Appliances and Equipment".

9.33.1.3. Structural Movement

(1) Where the *building* is in a location where the spectral response acceleration, $S_a(0.2)$, is greater than 0.55, heating and *air-conditioning* equipment with fuel or power connections shall be secured to the structure to resist overturning and displacement.

9.33.2. Required Heating Systems

9.33.2.1. Residential Heating Systems

(1) Residential *buildings* intended for use in the winter months on a continuing basis shall be equipped with heating facilities conforming to this Section.

9.33.3. Design Temperatures

9.33.3.1. Indoor Design Temperatures

(1) At the outside design temperature, required heating facilities shall be capable of maintaining an indoor air temperature of not less than,

(a) 22°C in all living spaces,

(b) 22°C in unfinished *basements*, and

(c) 15°C in heated crawl spaces.

9.33.3.2. Outdoor Design Temperatures

(1) The outdoor conditions to be used in designing heating, ventilating and *air-conditioning* systems shall be the appropriate values for the Municipality as set out in Supplementary Standard SB-1, using 2.5 per cent design temperature criteria.

9.33.4. Carbon Monoxide Detectors

9.33.4.1. Application

(1) This Subsection applies to every *building* that,

(a) contains a *residential occupancy*, and

(b) contains a fuel-burning *appliance* or a *storage garage*.

9.33.4.2. Location of Carbon Monoxide Detectors

(1) Where a fuel-burning *appliance* is installed in a *suite* of *residential occupancy*, a carbon monoxide detector shall be installed adjacent to each sleeping area in the suite.

(2) Where a fuel-burning *appliance* is installed in a *service room* that is not in a *suite* of *residential occupancy*, a carbon monoxide detector shall be installed,

(a) adjacent to each sleeping area in every *suite* of *residential occupancy* that is adjacent to the *service room*, and

(b) in the *service room*.

(3) Where a *storage garage* is located in a *building* containing a *residential occupancy*, a carbon monoxide detector shall be installed adjacent to each sleeping area in every *suite* of *residential occupancy* that is adjacent to the *storage garage*.

(4) Where a *storage garage* serves only the *dwelling unit* to which it is attached or built in, a carbon monoxide detector shall be installed adjacent to each sleeping area in the *dwelling unit*.

9.33.4.3. Installation and Conformance to Standards

(1) The carbon monoxide detector required by Article 9.33.4.2. shall,

(a) be permanently connected to an electrical circuit and shall have no disconnect switch between the overcurrent device and the carbon monoxide detector,

(b) be wired so that its activation will activate all carbon monoxide detectors within the *suite*, where located within a *suite* of *residential occupancy*,

(c) be equipped with an alarm that is audible within bedrooms when the intervening doors are closed, where located adjacent to a sleeping area, and

(d) conform to,

(i) CAN/CSA-6.19, "Residential Carbon Monoxide Alarming Devices", or

(ii) UL 2034, "Single and Multiple Station Carbon Monoxide Alarms".

Section 9.34. Electrical Facilities

9.34.1. General

9.34.1.1. Reserved

9.34.1.2. Required Facilities

(1) Where electrical services are available, electrical facilities shall be provided for every *building* in conformance with this Section.

9.34.1.3. Location of Equipment in Public Areas

(1) Entrance switches, meters, panel boxes, splitter boxes, time clocks and other similar equipment shall not be located in any public area unless adequate precautions are taken to prevent interference with the equipment.

9.34.1.4. Recessed Lighting Fixtures

(1) Recessed lighting fixtures shall not be located in insulated ceilings unless the fixtures are designed for such installations.

9.34.1.5. Wiring and Cables

(1) Except for *dwelling units* and except as required in Sentence (2), electrical wiring and cables installed in *buildings* permitted to be of *combustible construction* shall conform to Sentence 3.1.4.3.(1).

(2) Where a concealed space in a floor or ceiling assembly is used as a *plenum*, electrical wiring and cables within the *plenum* shall conform to Sentence 3.6.4.3.(1).

9.34.2. Lighting Outlets

9.34.2.1. Lighting of Entrances

(1) An exterior lighting outlet with fixture controlled by a wall switch located within the *building* shall be provided at every entrance to *buildings* of *residential occupancy*.

9.34.2.2. Outlets in Dwelling Units

(1) Except as provided in Sentence (2), a lighting outlet with fixture controlled by a wall switch shall be provided in kitchens, bedrooms, living rooms, utility rooms, laundry rooms, dining rooms, bathrooms, water closet rooms, vestibules and hallways in *dwelling units*.

(2) Where a receptacle controlled by a wall switch is provided in bedrooms or living rooms, such rooms need not conform to the requirements of Sentence (1).

9.34.2.3. Stairways

(1) Every stairway shall be lighted.

(2) Except as provided in Sentence (3), 3-way wall switches located at the head and foot of every stairway shall be provided to control at least one lighting outlet with fixture for stairways with 4 or more risers in *dwelling units*.

(3) The stairway lighting for *basements* that do not contain finished space or lead to an outside entrance or built-in garage and that serve not more than one *dwelling unit* is permitted to be controlled by a single switch located at the head of the stairs.

9.34.2.4. Basements

(1) A lighting outlet with fixture shall be provided for each 30 m² of floor area or fraction of it in unfinished *basements*.

(2) The outlet required in Sentence (1) nearest the stairs shall be controlled by a wall switch located at the head of the stairs.

9.34.2.5. Storage Rooms

(1) A lighting outlet with fixture shall be provided in storage rooms.

9.34.2.6. Garages and Carports

(1) A lighting outlet with fixture shall be provided for an attached, built-in or detached garage or carport.

(2) Except as provided in Sentence (3), lighting outlets required in Sentence (1) shall be controlled by a wall switch near the doorway.

(3) Where the lighting outlet and fixture required in Sentence (1) are ceiling mounted above an area not normally occupied by a parked car; or are wall mounted, a fixture with a built-in switch is permitted to be used.

(4) Where a carport is lighted by a light at the entrance to a *dwelling unit*, additional carport lighting is not required.

9.34.2.7. Public and Service Areas

(1) Every public or service area in *buildings*, including a *recreational camp* and a *camp for housing of workers*, shall have lighting outlets with fixtures controlled by a wall switch or panel.

(2) When provided by incandescent lighting, illumination required in Sentence (1) shall conform to Table 9.34.2.7.

(3) When other types of lighting are used, illumination equivalent to that shown in Table 9.34.2.7. shall be provided.

Table 9.34.2.7.
Lighting for Public Areas

Forming Part of Sentences 9.34.2.7.(2) and (3)

COLUMN 1	COLUMN 2	COLUMN 3
Room or Space	Minimum Illumination, lx	Minimum Lighting Power Density, W/M^2 of *floor area* (incandescent lighting)
Storage rooms	50	5
Service rooms and laundry areas	200	20
Garages	50	5
Public water closet rooms	100	10
Service hallways and stairways	50	5
Recreation rooms	100	10
Recreational camps and *camps for housing of workers* hallways, corridors, stairways and sleeping areas	100	10
Kitchen	500	50
All other rooms	250	25

9.34.3. Emergency Lighting

9.34.3.1. Emergency Lighting

(1) Emergency lighting shall conform to Subsection 9.9.11.

9.34.4. Service Entrance Requirements

9.34.4.1. Meter Mounting Device

(1) Except in the case of externally mounted read-outs, each new residential consumer service of 200 amperes or less shall have a meter mounting device located outdoors in an accessible location.

(2) For the purposes of this Subsection, the front of the *building* is the side nearest the utility distribution line.

9.34.4.2. Location of Meter Mounting Device

(1) Meter mounting devices shall be installed on the wall of the *building* or where that is not possible, on a separate support, so that the midpoint of the meter after installation will be 1 750 mm ±100 mm from finished *grade*.

(2) Meter mounting devices shall be located not more than 3 m back from the front of the single family and semi-detached homes.

9.34.4.3. Location of Consumer Service Standpipe

(1) For an underground supply, the bottom of the consumer service standpipe shall be located not more than 3 m from the corner of the *building*.

(2) For an overhead supply, the top of the consumer service standpipe shall be located not more than 3 m from the corner of the *building* except that where this location does not permit a 4.5 m clearance at the point of attachment of the service conductors to the *building*, the top of the standpipe may be extended to a point not more than half way along the *building*.

9.34.4.4. Meter Mounting Device

(1) The meter mounting device shall be,

(a) one hundred ampere capacity except when the service equipment is to be greater,

(b) standardized for each service size, and

(c) capable of accepting 2 in. IPS conduit of steel, aluminum, copper or PVC if intended for underground service entrance.

9.34.4.5. Underground Service

(1) For consumer services supplied underground,

(a) a 2 in. IPS steel, aluminum, copper or PVC conduit shall be attached to the bottom of the meter-mounting device and shall terminate in the earth at a point at least 900 mm below *grade* and a conduit bushing shall be attached to the conduit in the earth, and

(b) the conductors on the line side of the meter and those on the load side of the meter shall not be installed in the same conduit.

Section 9.35. Garages and Carports

9.35.1. Scope

9.35.1.1. Application

(1) This Section applies to garages and carports serving a single *dwelling unit*.

9.35.1.2. Construction Requirements

(1) The construction of a garage or carport shall conform to the requirements for other *buildings* in this Part except as provided in this Section.

9.35.2. General

9.35.2.1. Carport Considered to be Garage

(1) Where a roofed enclosure used for the storage or parking of motor vehicles has more than 60 per cent of the total perimeter enclosed by walls, doors or windows, the enclosure shall be considered a garage.

9.35.2.2. Garage Floor

(1) Where an attached or built-in garage is provided, the garage floor shall be sloped to drain liquids to the outdoors.

9.35.3. Foundations

9.35.3.1. Foundation Required

(1) Except as permitted in this Subsection, *foundations* conforming to Sections 9.12. and 9.15. shall be provided for the support of carport and garage super-structures, including that portion beneath garage doors.

9.35.3.2. Protection from Damage due to Soil Movement

(1) In clay-type *soils* subject to significant movement with a change in *soil* moisture content, the *foundation* depth of carports or garages connected to a *dwelling unit* directly or by a breezeway shall be approximately the same depth as the main *building foundation*.

(2) Where slab-on-ground construction is used, a construction joint shall be provided between the main *building* slab and the garage or breezeway or carport slab.

(3) Except as provided in Section 9.12., *foundations* for attached unheated garages or carports shall be below frost level.

9.35.3.3. Small Garages

(1) Detached garages of less than 50 m² floor area and not more than 1 *storey* in height may be supported on wood mud sills provided the garage is not of masonry or masonry veneer construction.

9.35.3.4. Column Piers

(1) Piers for the support of carport columns shall extend not less than 150 mm above ground level.

(2) Piers referred to in Sentence (1) shall project not less than 25 mm beyond the base of the column but in no case be less than 190 mm by 190 mm in size.

9.35.4. Walls and Columns

9.35.4.1. Interior Finish

(1) Interior finish need not be applied to garage and carport walls.

9.35.4.2. Columns

(1) Columns for garages and carports shall conform to Section 9.17., except that 89 mm by 89 mm wood columns may be used.

9.35.4.3. Anchorage

(1) Garage or carport walls and columns shall be anchored to the *foundation* to resist wind uplift in conformance with Subsection 9.23.6., except that where a garage is supported on the surface of the ground, ground anchors shall be provided to resist wind uplift.

Section 9.36. Cottages

9.36.1. Scope

9.36.1.1. Application

(1) This Section applies to *buildings* of *residential occupancy* used or intended to be used as seasonal recreational *buildings*.

(2) The *buildings* described in Sentence (1) shall comply with all the requirements of this Part, except where they are specifically exempted in this Section.

9.36.2. General

9.36.2.1. Exclusions

(1) Except as provided in Articles 9.36.3.1. and 9.36.2.4. and Subsection 9.10.15., *buildings* used or intended to be used as seasonal recreational *buildings* need not comply with Sections 9.5. to 9.7. and 9.9. to 9.11.

(2) Flooring need not comply with Section 9.30., but tight-fitting floors shall be provided to support the *live* and *dead loads*.

(3) Except as provided in Sentences (4) and (5), thermal insulation, vapour barrier, air-barrier construction, interior finishes, plumbing, heating, mechanical ventilation, *air-conditioning* and electrical facilities, need not be provided, but where any of these are provided, they shall comply with the requirements of this Part.

(4) Where heating and *air-conditioning* are provided, Article 9.33.3.1. need not be complied with.

(5) Where thermal insulation is provided, the minimum thermal resistance of insulation in Table 9.25.2.1. need not be provided.

9.36.2.2. Foundations

(1) Continuous perimeter *foundation* walls are not required, but when they are provided, they shall comply with the requirements of this Part.

(2) Where unit masonry columns are used, the height of such columns shall not exceed,

(a) in the case of hollow masonry units, 4 times the least dimension of the units,

(b) in the case of solid masonry units or hollow units with voids filled with concrete, 10 times the least dimension of the column, or

(c) where the column is reinforced with at least four 13 mm diameter bars and filled with concrete, 18 times the least dimension of the column.

(3) Columns in excess of the height limitations of Clauses (2)(a) to 2(c) shall be designed in accordance with Part 4.

9.36.2.3. Waterproofing and Dampproofing

(1) Where *foundations* below ground level and concrete floors on ground are used, they shall comply with Section 9.13.

9.36.2.4. Smoke Alarms

(1) Every *dwelling unit* within the scope of this Section shall be provided with a *smoke alarm* in accordance with Subsection 9.10.19.

9.36.3. Tourist Accommodation

9.36.3.1. Buildings for Seasonal Tourist Accommodation or for Rent

(1) Where *buildings* are used or intended to be used for seasonal tourist accommodation or for rent, they shall comply with Sections 9.5. to 9.8. in addition to the requirements of this Section.

Section 9.37. Log Construction

9.37.1. General

9.37.1.1. Material Requirements

(1) Logs that are sound and free of fractures may be used for *foundations*, beams, posts and similar members providing it can be shown by a structural analysis or tests or previous experience that the strength of the member is adequate for its intended purposes.

9.37.1.2. Requirement for Wood Preservative

(1) The portion of any log coming in contact with masonry or concrete at or below *grade* shall be treated with a wood preservative to prevent decay.

9.37.1.3. Exterior Joints

(1) All exterior joints between logs shall be rendered water-tight by methods such as machined joints, oakum packing, cement parging, chinking, caulking or a combination of these.

9.37.2. Walls

9.37.2.1. Logs

(1) Walls may be built of natural or manufactured logs.

9.37.2.2. Attachment of Logs

(1) Walls made of logs in a horizontal position shall have interlocking intersections that will prevent the collection of water in the joints, or the horizontal logs shall butt to a vertical corner post to which the horizontal logs shall be firmly attached.

9.37.2.3. Joining Logs

(1) Each log in a horizontal position shall be scribed as close as possible to its bearer and fastened to the bearer in at least three places throughout its length, by dowels, continuous machined joints, vertical framing members or interlocking intersections or any combination of these, but in no case shall the distance between fastenings exceed 1 800 mm.

9.37.2.4. Vertical Logs

(1) Each log in a wall built of vertical logs shall be scribed to fit as closely as possible to the adjacent logs.

9.37.2.5. Plates

(1) Logs used in a vertical position shall have a plate at the top and a plate at the bottom and the plates shall be at least as wide as the largest end diameter of any of the logs.

9.37.3. Lintels

9.37.3.1. Support Over Openings

(1) Logs placed in vertical position shall be supported over window and door openings by lintels meeting the requirements of Tables A-12 to A-16.

9.37.3.2. Clearance

(1) At every opening in a wall made of logs in a horizontal position where shrinkage can occur there shall be a clearance between the rough buck header and the lintel log of not less than 13 mm in width for each 300 mm of height to allow for settlement.

Section 9.38. Reserved

Section 9.39. Park Model Trailers

9.39.1. Scope

9.39.1.1. Application

(1) This Section applies to manufactured *buildings* designed and constructed in conformance with CAN/CSA-Z241 Series, "Park Model Trailers", and used or intended to be used as a seasonal recreational *building* of *residential occupancy*.

9.39.2. General

9.39.2.1. General

(1) Except as provided in Subsection 9.39.3., a manufactured *building* used or intended to be used as a seasonal recreational *building* of *residential occupancy* is deemed to comply with this Code if it is designed and constructed in conformance with CAN/CSA-Z241 Series, "Park Model Trailers".

9.39.3. Requirements

9.39.3.1. Other Building Components

(1) The requirements of this Code shall apply to *building* components designed and *constructed* outside the place of manufacture of a *building* described in Article 9.39.1.1.

9.39.3.2. Spatial Separation

(1) *Buildings* described in Article 9.39.1.1. shall comply with Section 9.10. where the *building* is,

(a) used or intended to be used for seasonal tourist accommodation, or

(b) leased or intended to be leased.

9.39.3.3. Foundations and Anchorage

(1) *Buildings* described in Article 9.39.1.1. shall be supported and anchored in conformance with the manufacturer's installation instructions.

9.39.3.4. Proximity to Above Ground Electrical Conductors

(1) *Buildings* described in Article 9.39.1.1. shall comply with Article 9.1.1.5.

Section 9.40. Reinforced Concrete Slabs

9.40.1. Scope

9.40.1.1. Application

(1) This Section applies to,

(a) reinforced concrete slabs that are suspended over cold rooms in *basements*, and are supported by *foundation* walls along the perimeter of the slab with no additional interior supports and

(b) slabs in which the clear span between supporting walls is not more than 2 500 mm along the shortest dimension of the slab.

(2) Slabs for conditions other than described in Sentence (1) shall be designed in accordance with Part 4.

(3) This Section does not apply to reinforced concrete slabs intended to support motor vehicles.

9.40.1.2. Concrete

(1) Concrete shall conform to Section 9.3.

9.40.1.3. Reinforcing Steel

(1) Reinforcing steel shall conform to Grade 400 in CAN/CSA-G30.18-M, "Billet Steel Bars for Concrete Reinforcement".

9.40.1.4. Slab Construction

(1) Concrete shall be cast against form work in accordance with CAN/CSA-A23.1-M, "Concrete Materials and Methods of Concrete Construction".

(2) The slab shall be not less than 125 mm thick.

(3) The slab shall be reinforced with 10M bars spaced not more than 200 mm on centre in each direction, with 30 mm clear cover from the bottom of the slab to the first layer of bars, and the second layer of bars laid directly on top of the lower layer in the opposite direction.

(4) The slab shall bear not less than 75 mm on the supporting *foundation* walls and be anchored to the walls with 600 × 600 mm 10M bent dowels spaced at not more than 600 mm on centre.

(5) Exposed slabs shall be sloped to effectively shed water away from the exterior wall.

Section 9.41. Additional Requirements for Change of Use

9.41.1. Scope

9.41.1.1. Application

(1) This Section applies where proposed *construction* in respect of an existing *building* will result in any of the following changes of use of all or part of the *building*:

(a) a change of the *major occupancy* of all or part of a *building* that is designated with a "Y" in Table 1.3.1.4. of Division C,

(b) a *suite* of a Group C *major occupancy* is converted into more than one *suite* of a Group C *major occupancy*,

(c) a *farm building* or part of a *farm building* is changed to a *major occupancy*,

(d) a *building* or part of a *building* is changed to a *post-disaster building*, or

(e) the use of a *building* or part of a *building* is changed and the previous *major occupancy* of the *building* or part of the *building* cannot be determined.

(2) For the purposes of this Section and Sentences 11.4.2.1.(1) and 11.4.2.5.(4), the changes of use set out in Clauses (1)(b) to (e) shall also be deemed to constitute a change in *major occupancy*.

(3) The requirements of this Section are in addition to the requirements of other Parts of the Code as they apply to the proposed *construction*.

9.41.2. Additional Construction

9.41.2.1. Change of Use and Compensating Construction

(1) Where proposed *construction* will result in a change of use described in Clauses 9.41.1.1.(1)(a) to (d), additional *construction* shall be required in order that the *building* or part of a *building* subject to the change of use conforms to the requirements of Sections 9.5. and 9.7., Subsection 9.10.17., Sections 9.31. and 9.32., and Subsections 9.34.1. to 9.34.3. as they apply to the new *major occupancy* that the *building* or part of a *building* is to support.

(2) For the purposes of this Article, existing *buildings* shall be classified as to their *construction* and *occupancy* as provided for in Sentence 11.2.1.1.(1).

9.41.2.2. Performance Level Evaluation and Compensating Construction

(1) The *performance level* of a *building* after *construction* shall not be less than the *performance level* of the *building* prior to *construction*.

(2) For the purposes of Sentence (1), reduction of *performance level* shall be determined in accordance with Articles 11.4.2.1., 11.4.2.3. and 11.4.2.5.

(3) Where the proposed *construction* would reduce the *performance level* of an existing *building*, compensating *construction* shall be required in conformance with Articles 11.4.3.1., 11.4.3.2., 11.4.3.4. and 11.4.3.6.

(4) Section 11.5. applies in respect of the requirements of Sentences 11.4.3.4.(1), (3) and (4).

Table A-1
Maximum Spans for Floor Joists – General Cases(1)

Forming Part of Sentence 9.23.4.2.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COL. 4	COL. 5	COL. 6	COL. 7	COL. 8	COL. 9	COL. 10	COL. 11	COL. 12
Commercial Designation	Grade	Joist Size, mm	Maximum Span, m								
			With Strapping(2)			With Bridging			With Strapping(2) and Bridging		
			Joist Spacing, mm			Joist Spacing, mm			Joist Spacing, mm		
			300	400	600	300	400	600	300	400	600
Douglas Fir – Larch (includes Douglas Fir and Western Larch)	Select Structural	38 × 89	2.13	1.97	1.73	2.19	1.99	1.73	2.19	1.99	1.73
		38 × 140	3.23	3.07	2.73	3.44	3.12	2.73	3.44	3.12	2.73
		38 × 184	3.88	3.69	3.51	4.18	3.92	3.59	4.37	4.07	3.59
		38 × 235	4.57	4.34	4.13	4.86	4.57	4.29	5.05	4.70	4.39
		38 × 286	5.21	4.95	4.71	5.49	5.16	4.85	5.66	5.28	4.92
	No. 1 and No. 2	38 × 89	2.00	1.85	1.66	2.09	1.90	1.66	2.09	1.90	1.66
		38 × 140	3.09	2.91	2.62	3.29	2.99	2.62	3.29	2.99	2.62
		38 × 184	3.71	3.53	3.36	4.00	3.76	3.44	4.19	3.90	3.44
		38 × 235	4.38	4.16	3.96	4.66	4.38	4.11	4.84	4.51	4.20
		38 × 286	4.99	4.75	4.52	5.26	4.94	4.65	5.43	5.06	4.72
	No. 3	38 × 89	1.90	1.69	1.38	1.95	1.69	1.38	1.95	1.69	1.38
		38 × 140	2.78	2.41	1.97	2.78	2.41	1.97	2.78	2.41	1.97
		38 × 184	3.38	2.93	2.39	3.38	2.93	2.39	3.38	2.93	2.39
		38 × 235	4.14	3.58	2.93	4.14	3.58	2.93	4.14	3.58	2.93
		38 × 286	4.80	4.16	3.39	4.80	4.16	3.39	4.80	4.16	3.39
	Construction	38 × 89	1.90	1.77	1.61	2.03	1.84	1.61	2.03	1.84	1.61
	Standard	38 × 89	1.81	1.63	1.33	1.88	1.63	1.33	1.88	1.63	1.33
Hem – Fir (includes Western Hemlock and Amabilis Fir)	Select Structural	38 × 89	2.08	1.93	1.71	2.16	1.96	1.71	2.16	1.96	1.71
		38 × 140	3.18	3.03	2.69	3.39	3.08	2.69	3.39	3.08	2.69
		38 × 184	3.82	3.64	3.46	4.12	3.87	3.54	4.31	4.02	3.54
		38 × 235	4.50	4.28	4.08	4.80	4.51	4.23	4.98	4.64	4.33
		38 × 286	5.14	4.89	4.65	5.42	5.09	4.78	5.59	5.21	4.86
	No. 1 and No. 2	38 × 89	2.00	1.85	1.66	2.09	1.90	1.66	2.09	1.90	1.66
		38 × 140	3.09	2.91	2.62	3.29	2.99	2.62	3.29	2.99	2.62
		38 × 184	3.71	3.53	3.36	4.00	3.76	3.44	4.19	3.90	3.44
		38 × 235	4.38	4.16	3.96	4.66	4.38	4.11	4.84	4.51	4.20
		38 × 286	4.99	4.75	4.52	5.26	4.94	4.65	5.43	5.06	4.72
	No. 3	38 × 89	1.90	1.77	1.61	2.03	1.84	1.61	2.03	1.84	1.61
		38 × 140	2.99	2.78	2.43	3.19	2.90	2.43	3.19	2.90	2.43
		38 × 184	3.60	3.42	2.95	3.88	3.61	2.95	4.06	3.61	2.95
		38 × 235	4.24	4.03	3.61	4.51	4.24	3.61	4.68	4.37	3.61
		38 × 286	4.84	4.60	4.19	5.10	4.79	4.19	5.26	4.90	4.19
	Construction	38 × 89	1.90	1.77	1.61	2.03	1.84	1.61	2.03	1.84	1.61
	Standard	38 × 89	1.81	1.68	1.39	1.96	1.71	1.39	1.96	1.71	1.39
Spruce – Pine – Fir (includes Spruce (all species except Coast Sitka Spruce) Jack Pine, Lodgepole Pine, Balsam Fir and Alpine Fir)	Select Structural	38 × 89	1.95	1.81	1.64	2.06	1.87	1.64	2.06	1.87	1.64
		38 × 140	3.05	2.85	2.57	3.24	2.95	2.57	3.24	2.95	2.57
		38 × 184	3.66	3.48	3.31	3.94	3.70	3.38	4.12	3.84	3.38
		38 × 235	4.31	4.10	3.90	4.59	4.31	4.05	4.76	4.44	4.14
		38 × 286	4.91	4.67	4.45	5.18	4.87	4.57	5.34	4.98	4.64
	No. 1 and No. 2	38 × 89	1.86	1.72	1.58	1.99	1.81	1.58	1.99	1.81	1.58
		38 × 140	2.92	2.71	2.49	3.14	2.85	2.49	3.14	2.85	2.49
		38 × 184	3.54	3.36	3.20	3.81	3.58	3.27	3.99	3.72	3.27
		38 × 235	4.17	3.96	3.77	4.44	4.17	3.92	4.60	4.29	4.00
		38 × 286	4.75	4.52	4.30	5.01	4.71	4.42	5.17	4.82	4.49
	No. 3	38 × 89	1.81	1.68	1.55	1.96	1.78	1.55	1.96	1.78	1.55
		38 × 140	2.84	2.64	2.43	3.08	2.80	2.43	3.08	2.80	2.43
		38 × 184	3.47	3.30	2.95	3.74	3.52	2.95	3.92	3.61	2.95
		38 × 235	4.09	3.89	3.61	4.36	4.09	3.61	4.52	4.22	3.61
		38 × 286	4.67	4.44	4.19	4.92	4.62	4.19	5.08	4.73	4.19

COLUMN 1	COLUMN 2	COLUMN 3	COL. 4	COL. 5	COL. 6	COL. 7	COL. 8	COL. 9	COL. 10	COL. 11	COL. 12
Commercial Designation	Grade	Joist Size, mm	Maximum Span, m								
			With Strapping$^{(2)}$			With Bridging			With Strapping$^{(2)}$ and Bridging		
			Joist Spacing, mm			Joist Spacing, mm			Joist Spacing, mm		
			300	400	600	300	400	600	300	400	600
	Construction	38 × 89	1.81	1.68	1.55	1.96	1.78	1.55	1.96	1.78	1.55
	Standard	38 × 89	1.70	1.58	1.44	1.88	1.71	1.44	1.88	1.71	1.44
Northern Species (includes any Canadian Species covered by the NLGA Standard Grading Rules	Select Structural	38 × 89	1.65	1.53	1.42	1.84	1.68	1.46	1.84	1.68	1.46
		38 × 140	2.59	2.41	2.24	2.90	2.63	2.30	2.90	2.63	2.30
		38 × 184	3.27	3.11	2.94	3.52	3.31	3.03	3.69	3.44	3.03
		38 × 235	3.85	3.66	3.48	4.10	3.85	3.62	4.26	3.97	3.70
		38 × 286	4.39	4.18	3.97	4.63	4.35	4.09	4.78	4.45	4.15
	No. 1 and No. 2	38 × 89	1.59	1.48	1.37	1.80	1.64	1.43	1.80	1.64	1.43
		38 × 140	2.51	2.33	2.16	2.83	2.57	2.25	2.83	2.57	2.25
		38 × 184	3.19	3.04	2.84	3.44	3.23	2.96	3.60	3.36	2.96
		38 × 235	3.76	3.58	3.41	4.01	3.77	3.54	4.16	3.88	3.62
		38 × 286	4.29	4.08	3.88	4.53	4.25	4.00	4.67	4.35	4.06
	No. 3	38 × 89	1.54	1.43	1.32	1.74	1.57	1.36	1.76	1.60	1.36
		38 × 140	2.42	2.24	1.94	2.74	2.38	1.94	2.75	2.38	1.94
		38 × 184	3.12	2.90	2.37	3.35	2.90	2.37	3.35	2.90	2.37
		38 × 235	3.67	3.49	2.89	3.91	3.54	2.89	4.06	3.54	2.89
		38 × 286	4.19	3.98	3.36	4.42	4.11	3.36	4.55	4.11	3.36
	Construction	38 × 89	1.54	1.43	1.32	1.74	1.57	1.40	1.76	1.60	1.40
	Standard	38 × 89	1.48	1.37	1.15	1.63	1.41	1.15	1.63	1.41	1.15

Notes to Table A-1:

(1) Spans apply only where the floors serve residential areas as described in Table 4.1.5.3., or the uniformly distributed *live load* on the floor does not exceed that specified for residential areas as described in Table 4.1.5.3.

(2) See Sentence 9.23.9.4.(5) for alternatives to strapping.

Table A-2
Maximum Spans for Floor Joists – Special Cases(1)

Forming Part of Sentence 9.23.4.2.(1) and 9.23.4.4.(2)

COLUMN 1	COLUMN 2	COLUMN 3	COL. 4	COL. 5	COL. 6	COL. 7	COL. 8	COL. 9	COL. 10	COL. 11	COL. 12
Commercial Designation	Grade	Joist Size, mm	Maximum Span, m								
			Joists with Ceilings Attached to Wood Furring						Joists with Concrete Topping		
			Without Bridging			With Bridging			With or Without Bridging$^{(2)}$		
			Joist Spacing, mm			Joist Spacing, mm			Joist Spacing, mm		
			300	400	600	300	400	600	300	400	600
Douglas Fir – Larch (includes Douglas Fir and Western Larch)	Select Structural	38 × 89	2.19	1.99	1.73	2.19	1.99	1.73	2.19	1.99	1.73
		38 × 140	3.44	3.12	2.73	3.44	3.12	2.73	3.44	3.12	2.73
		38 × 184	4.24	3.99	3.59	4.52	4.11	3.59	4.52	4.11	3.59
		38 × 235	4.98	4.69	4.29	5.47	5.20	4.58	5.77	5.24	4.58
		38 × 286	5.67	5.34	4.88	6.19	5.89	5.54	6.83	6.37	5.58
	No. 1 and No. 2	38 × 89	2.09	1.90	1.66	2.09	1.90	1.66	2.09	1.90	1.66
		38 × 140	3.29	2.99	2.62	3.29	2.99	2.62	3.29	2.99	2.55
		38 × 184	4.06	3.83	3.44	4.33	3.93	3.44	4.33	3.81	3.11
		38 × 235	4.78	4.50	4.11	5.24	4.98	4.31	5.37	4.65	3.80
		38 × 286	5.44	5.12	4.68	5.93	5.64	5.00	6.24	5.40	4.41
	No. 3	38 × 89	1.95	1.69	1.38	1.95	1.69	1.38	1.72	1.49	1.21
		38 × 140	2.78	2.41	1.97	2.78	2.41	1.97	2.45	2.12	1.73
		38 × 184	3.38	2.93	2.39	3.38	2.93	2.39	2.98	2.58	2.11
		38 × 235	4.14	3.58	2.93	4.14	3.58	2.93	3.65	3.16	2.58
		38 × 286	4.80	4.16	3.39	4.80	4.16	3.39	4.23	3.66	2.99
	Construction	38 × 89	2.03	1.84	1.61	2.03	1.84	1.61	2.03	1.84	1.61
	Standard	38 × 89	1.88	1.63	1.33	1.88	1.63	1.33	1.66	1.44	1.17

COLUMN 1	COLUMN 2	COLUMN 3	COL. 4	COL. 5	COL. 6	COL. 7	COL. 8	COL. 9	COL. 10	COL. 11	COL. 12
Commercial Designation	Grade	Joist Size, mm	Maximum Span, m								
			Joists with Ceilings Attached to Wood Furring						Joists with Concrete Topping		
			Without Bridging			With Bridging			With or Without Bridging(2)		
			Joist Spacing, mm			Joist Spacing, mm			Joist Spacing, mm		
			300	400	600	300	400	600	300	400	600
Hem – Fir (includes Western Hemlock and Amabilis Fir)	Select Structural	38 × 89	2.16	1.96	1.71	2.16	1.96	1.71	2.16	1.96	1.71
		38 × 140	3.39	3.08	2.69	3.39	3.08	2.69	3.39	3.08	2.69
		38 × 184	4.18	3.94	3.54	4.46	4.05	3.54	4.46	4.05	3.54
		38 × 235	4.92	4.63	4.23	5.39	5.13	4.52	5.69	5.17	4.52
		38 × 286	5.60	5.27	4.82	6.10	5.81	5.47	6.74	6.28	5.50
	No. 1 and No. 2	38 × 89	2.09	1.90	1.66	2.09	1.90	1.66	2.09	1.90	1.66
		38 × 140	3.29	2.99	2.62	3.29	2.99	2.62	3.29	2.99	2.62
		38 × 184	4.06	3.83	3.44	4.33	3.93	3.44	4.33	3.93	3.26
		38 × 235	4.78	4.50	4.11	5.24	4.98	4.39	5.53	4.88	3.99
		38 × 286	5.44	5.12	4.68	5.93	5.64	5.25	6.54	5.66	4.63
	No 3	38 × 89	2.03	1.84	1.61	2.03	1.84	1.61	2.03	1.83	1.50
		38 × 140	3.19	2.90	2.43	3.19	2.90	2.43	3.02	2.62	2.14
		38 × 184	3.94	3.61	2.95	4.17	3.61	2.95	3.68	3.18	2.60
		38 × 235	4.63	4.36	3.61	5.08	4.42	3.61	4.50	3.89	3.18
		38 × 286	5.27	4.96	4.19	5.74	5.13	4.19	5.22	4.52	3.69
	Construction	38 × 89	2.03	1.84	1.61	2.03	1.84	1.61	2.03	1.84	1.61
	Standard	38 × 89	1.96	1.71	1.39	1.96	1.71	1.39	1.74	1.50	1.23
Spruce – Pine – Fir (includes Spruce (all species except Coast Sitka Spruce) Jack Pine, Lodgepole Pine, Balsam Fir and Alpine Fir)	Select Structural	38 × 89	2.06	1.87	1.64	2.06	1.87	1.64	2.06	1.87	1.64
		38 × 140	3.24	2.95	2.57	3.24	2.95	2.57	3.24	2.95	2.57
		38 × 184	4.00	3.77	3.38	4.26	3.87	3.38	4.26	3.87	3.38
		38 × 235	4 70	4.43	4.05	5.16	4.91	4.32	5.45	4.95	4.32
		38 × 286	5.35	5.04	4.61	5.84	5.55	5.23	6.45	6.01	5.26
	No. 1 and No. 2	38 × 89	1.99	1.81	1.58	1.99	1.81	1.58	1.99	1.81	1.58
		38 × 140	3.14	2.85	2.49	3.14	2.85	2.49	3.14	2.85	2.49
		38 × 184	3.87	3.64	3.27	4.12	3.75	3.27	4.12	3.75	3.27
		38 × 235	4.55	4.28	3.91	4.99	4.75	4.18	5.27	4.79	4.13
		38 × 286	5.18	4.88	4.46	5.65	5.37	5.06	6.23	5.81	4.79
	No. 3	38 × 89	1.96	1.78	1.55	1.96	1.78	1.55	1.96	1.78	1.50
		38 × 140	3.08	2.80	2.43	3.08	2.80	2.43	3.02	2.62	2.14
		38 × 184	3.80	3.58	2.95	4.05	3.61	2.95	3.68	3.18	2.60
		38 × 235	4.47	4.21	3.61	4.90	4.42	3.61	4.50	3.89	3.18
		38 × 286	5.09	4.79	4.19	5.55	5.13	4.19	5.22	4.52	3.69
	Construction	38 × 89	1.96	1.78	1.55	1.96	1.78	1.55	1.96	1.78	1.55
	Standard	38 × 89	1.88	1.71	1.44	1.88	1.71	1.44	1.80	1.56	1.27
Northern Species (includes any Canadian Species covered by the NLGA Standard Grading Rules	Select Structural	38 × 89	1.84	1.68	1.46	1.84	1.68	1.46	1.84	1.68	1.46
		38 × 140	2.90	2.63	2.30	2.90	2.63	2.30	2.90	2.63	2.30
		38 × 184	3.58	3.37	3.03	3.81	3.46	3.03	3.81	3.46	3.03
		38 × 235	4.20	3.96	3.62	4.61	4.39	3.86	4.87	4.42	3.86
		38 × 286	4.79	4.51	4.12	5.22	4.96	4.68	5.76	5.37	4.54
	No. 1 and No. 2	38 × 89	1.80	1.64	1.43	1.80	1.64	1.43	1.80	1.64	1.43
		38 × 140	2.83	2.57	2.25	2.83	2.57	2.25	2.83	2.57	2.23
		38 × 184	3.50	3.29	2.96	3.72	3.38	2.96	3.72	3.32	2.71
		38 × 235	4.11	3.87	3.54	4.51	4.29	3.76	4.69	4.06	3.31
		38 × 286	4.68	4.40	4.03	5.10	4.85	4.36	5.44	4.71	3.84
	No. 3	38 × 89	1.76	1.60	1.36	1.76	1.60	1.36	1.70	1.47	1.20
		38 × 140	2.75	2.38	1.94	2.75	2.38	1.94	2.42	2.10	1.71
		38 × 184	3.35	2.90	2.37	3.35	2.90	2.37	2.95	2.55	2.08
		38 × 235	4.01	3.54	2.89	4.09	3.54	2.89	3.61	3.12	2.55
		38 × 286	4.56	4.11	3.36	4.75	4.11	3.36	4.18	3.62	2.96
	Construction	38 × 89	1.76	1.60	1.40	1.76	1.60	1.40	1.76	1.60	1.37
	Standard	38 × 89	1.63	1.41	1.15	1.63	1.41	1.15	1.44	1.25	1.02

Notes to Table A-2:

(1) Spans apply only where the floors serve residential areas as described in Table 4.1.5.3., or the uniformly distributed *live load* on the floor does not exceed that specified for residential areas as described in Table 4.1.5.3.

(2) No bridging is assumed for spans for floor joists with concrete topping.

Table A-3
Maximum Spans for Ceiling Joists – Attic not Accessible by a Stairway

Forming Part of Sentence 9.23.4.2.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6
Commercial Designation	Grade	Joist Size, mm	Maximum Span, m		
			Joist Spacing, mm		
			300	400	600
Douglas Fir – Larch (includes Douglas Fir and Western Larch)	Select Structural	38 × 89	3.4	3.10	2.71
		38 × 140	5.37	4.88	4.26
		38 × 184	7.05	6.41	5.60
		38 × 235	9.01	8.18	7.15
		38 × 286	10.96	9.96	8.70
	No. 1 and No. 2	38 × 89	3.27	2.97	2.59
		38 × 140	5.14	4.67	4.08
		38 × 184	6.76	6.14	5.36
		38 × 235	8.63	7.84	6.85
		38 × 286	10.50	9.54	8.34
	No. 3	38 × 89	3.17	2.88	2.42
		38 × 140	4.89	4.23	3.46
		38 × 184	5.95	5.15	4.20
		38 × 235	7.27	6.30	5.14
		38 × 286	8.44	7.31	5.97
	Construction	38 × 89	3.17	2.88	2.51
	Standard	38 × 89	3.06	2.78	2.34
Hem – Fir (includes Western Hemlock and Amabilis Fir)	Select Structural	38 × 89	3.36	3.06	2.67
		38 × 140	5.29	4.81	4.20
		38 × 184	6.96	6.32	5.52
		38 × 235	8.88	8.07	7.05
		38 × 286	10.81	9.82	8.58
	No. 1 and No. 2	38 × 89	3.27	2.97	2.59
		38 × 140	5.14	4.67	4.08
		38 × 184	6.76	6.14	5.36
		38 × 235	8.63	7.84	6.85
		38 × 286	10.50	9.54	8.34
	No. 3	38 × 89	3.17	2.88	2.51
		38 × 140	4.98	4.53	3.95
		38 × 184	6.55	5.95	5.19
		38 × 235	8.36	7.60	6.34
		38 × 286	10.18	9.01	7.36
	Construction	38 × 89	3.17	2.88	2.50
	Standard	38 × 89	3.06	2.78	2.43
Spruce – Pine – Fir (includes Spruce (all species except Coast Sitka Spruce) Jack Pine, Lodgepole Pine, Balsam Fir and Alpine Fir)	Select Structural	38 × 89	3.22	2.92	2.55
		38 × 140	5.06	4.60	4.02
		38 × 184	6.65	6.05	5.28
		38 × 235	8.50	7.72	6.74
		38 × 286	10.34	9.40	8.21
	No. 1 and No. 2	38 × 89	3.11	2.83	2.47
		38 × 140	4.90	4.45	3.89
		38 × 184	6.44	5.85	5.11
		38 × 235	8.22	7.47	6.52
		38 × 286	10.00	9.09	7.94
	No. 3	38 × 89	3.06	2.78	2.43
		38 × 140	4.81	4.37	3.82
		38 × 184	6.32	5.74	5.02
		38 × 235	8.07	7.33	6.34
		38 × 286	9.82	8.93	7.36

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6
Commercial Designation	Grade	Joist Size, mm	Maximum Span, m		
			Joist Spacing, mm		
			300	400	600
	Construction	38 × 89	3.06	2.78	2.43
	Standard	38 × 89	2.94	2.67	2.33
Northern Species (includes any Canadian Species covered by the NLGA Standard Grading Rules	Select Structural	38 × 89	2.88	2.61	2.28
		38 × 140	4.53	4.11	3.59
		38 × 184	5.95	5.40	4.72
		38 × 235	7.60	6.90	6.03
		38 × 286	9.25	8.40	7.34
	No. 1 and No. 2	38 × 89	2.81	2.55	2.23
		38 × 140	4.42	4.02	3.51
		38 × 184	5.81	5.28	4.61
		38 × 235	7.42	6.74	5.89
		38 × 286	9.03	8.21	7.17
	No. 3	38 × 89	2.74	2.49	2.18
		38 × 140	4.31	3.92	3.42
		38 × 184	5.67	5.09	4.16
		38 × 235	7.19	6.23	5.08
		38 × 286	8.34	7.23	5.90
	Construction	38 × 89	2.74	2.49	2.18
	Standard	38 × 89	2.67	2.43	2.03

Table A-4
Maximum Spans for Roof Joists – Specified Roof Snow Loads 1.0 to 2.0 kPa

Forming Part of Sentence 9.23.4.2.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COL. 4	COL. 5	COL. 6	COL. 7	COL. 8	COL. 9	COL. 10	COL. 11	COL. 12
Commercial Designation	Grade	Joist Size, mm	Maximum Span, m								
			Specified Snow Load, kPa								
			1.0			1.5			2.0		
			Joist Spacing, mm			Joist Spacing, mm			Joist Spacing, mm		
			300	400	600	300	400	600	300	400	600
Douglas Fir – Larch (includes Douglas Fir and Western Larch)	Select Structural	38 × 89	2.71	2.46	2.15	2.37	2.15	1.88	2.15	1.95	1.71
		38 × 140	4.26	3.87	3.38	3.72	3.38	2.95	3.38	3.07	2.68
		38 × 184	5.60	5.09	4.44	4.89	4.44	3.88	4.44	4.04	3.53
		38 × 235	7.15	6.49	5.67	6.24	5.67	4.96	5.67	5.15	4.50
		38 × 286	8.70	7.90	6.91	7.60	6.91	6.03	6.91	6.27	5.48
	No. 1 and No. 2	38 × 89	2.59	2.36	2.06	2.27	2.06	1.80	2.06	1.87	1.63
		38 × 140	4.08	3.71	3.24	3.57	3.24	2.83	3.24	2.94	2.57
		38 × 184	5.36	4.87	4.26	4.69	4.26	3.72	4.26	3.87	3.38
		38 × 235	6.85	6.22	5.44	5.98	5.44	4.74	5.44	4.94	4.22
		38 × 286	8.34	7.57	6.40	7.28	6.62	5.50	6.62	6.00	4.90
	No. 3	38 × 89	2.49	2.16	1.76	2.14	1.85	1.51	1.91	1.65	1.35
		38 × 140	3.56	3.08	2.51	3.06	2.65	2.16	2.72	2.36	1.92
		38 × 184	4.33	3.75	3.06	3.72	3.22	2.63	3.31	2.87	2.34
		38 × 235	5.29	4.58	3.74	4.55	3.94	3.22	4.05	3.51	2.86
		38 × 286	6.14	5.32	4.34	5.28	4.57	3.73	4.70	4.07	3.32
	Construction	38 × 89	2.51	2.28	1.99	2.20	1.99	1.74	1.99	1.81	1.58
	Standard	38 × 89	2.41	2.08	1.70	2.07	1.79	1.46	1.84	1.60	1.30
Hem – Fir (includes Western Hemlock and Amabilis Fir)	Select Structural	38 × 89	2.67	2.43	2.12	2.33	2.12	1.85	2.12	1.93	1.68
		38 × 140	4.20	3.82	3.33	3.67	3.33	2.91	3.33	3.03	2.65
		38 × 184	5.52	5.02	4.38	4.82	4.38	3.83	4.38	3.98	3.48
		38 × 235	7.05	6.41	5.60	6.16	5.60	4.89	5.60	5.09	4.44
		38 × 286	8.58	7.80	6.81	7.50	6.81	5.95	6.81	6.19	5.41
	No. 1 and No. 2	38 × 89	2.59	2.36	2.06	2.27	2.06	1.80	2.06	1.87	1.63
		38 × 140	4.08	3.71	3.24	3.57	3.24	2.83	3.24	2.94	2.57
		38 × 184	5.36	4.87	4.26	4.69	4.26	3.72	4.26	3.87	3.38
		38 × 235	6.85	6.22	5.44	5.98	5.44	4.75	5.44	4.94	4.32
		38 × 286	8.34	7.57	6.62	7.28	6.62	5.77	6.62	6.01	5.25

COLUMN 1	COLUMN 2	COLUMN 3	COL. 4	COL. 5	COL. 6	COL. 7	COL. 8	COL. 9	COL. 10	COL. 11	COL. 12
Commercial Designation	Grade	Joist Size, mm	Maximum Span, m								
			Specified Snow Load, kPa								
			1.0			1.5			2.0		
			Joist Spacing, mm			Joist Spacing, mm			Joist Spacing, mm		
			300	400	600	300	400	600	300	400	600
	No. 3	38 × 89	2.51	2.28	1.99	2.20	1.99	1.74	1.99	1.81	1.58
		38 × 140	3.95	3.59	3.10	3.45	3.14	2.67	3.14	2.85	2.37
		38 × 184	5.20	4.62	3.77	4.54	3.97	3.24	4.09	3.54	2.89
		38 × 235	6.53	5.65	4.61	5.61	4.86	3.97	5.00	4.33	3.53
		38 × 286	7.57	6.56	5.35	6.51	5.64	4.60	5.80	5.02	4.10
	Construction	38 × 89	2.51	2.28	1.99	2.20	1.99	1.74	1.99	1.81	1.58
	Standard	38 × 89	2.43	2.18	1.78	2.12	1.88	1.53	1.93	1.67	1.36
Spruce - Pine - Fir (includes Spruce (all species except Coast Sitka Spruce) Jack Pine, Lodgepole Pine, Balsam Fir and Alpine Fir)	Select Structural	38 × 89	2.55	2.32	2.03	2.23	2.03	1.77	2.03	1.84	1.61
		38 × 140	4.02	3.65	3.19	3.51	3.19	2.79	3.19	2.90	2.53
		38 × 184	5.28	4.80	4.19	4.61	4.19	3.66	4.19	3.81	3.33
		38 × 235	6.74	6.13	5.35	5.89	5.35	4.68	5.35	4.86	4.25
		38 × 286	8.21	7.46	6.52	7.17	6.52	5.69	6.52	5.92	5.17
	No. 1 and No. 2	38 × 89	2.47	2.24	1.96	2.16	1.96	1.71	1.96	1.78	1.56
		38 × 140	3.89	3.53	3.08	3.40	3.08	2.69	3.08	2.80	2.45
		38 × 184	5.11	4.64	4.05	4.46	4.05	3.54	4.05	3.68	3.22
		38 × 235	6.52	5.93	5.18	5.70	5.18	4.52	5.18	4.70	4.11
		38 × 286	7.94	7.21	6.30	6.94	6.30	5.50	6.30	5.73	5.00
	No. 3	38 × 89	2.43	2.20	1.93	2.12	1.93	1.68	1.93	1.75	1.53
		38 × 140	3.82	3.47	3.03	3.33	3.03	2.65	3.03	2.75	2.37
		38 × 184	5.02	4.56	3.77	4.38	3.97	3.24	3.98	3.54	2.89
		38 × 235	6.41	5.65	4.61	5.60	4.86	3.97	5.00	4.33	3.53
		38 × 286	7.57	6.56	5.35	6.51	5.64	4.60	5.80	5.02	4.10
	Construction	38 × 89	2.43	2.20	1.93	2.12	1.93	1.68	1.93	1.75	1.53
	Standard	38 × 89	2.33	2.12	1.85	2.04	1.85	1.59	1.85	1.68	1.41
Northern Species (includes any Canadian Species covered by the NLGA Standard Grading Rules	Select Structural	38 × 89	2.28	2.07	1.81	1.99	1.81	1.58	1.81	1.65	1.44
		38 × 140	3.59	3.26	2.85	3.14	2.85	2.49	2.85	2.59	2.26
		38 × 184	4.72	4.29	3.75	4.12	3.75	3.27	3.75	3.40	2.97
		38 × 235	6.03	5.48	4.79	5.27	4.79	4.18	4.79	4.35	3.80
		38 × 286	7.34	6.67	5.82	6.41	5.82	5.09	5.82	5.29	4.62
	No. 1 and No. 2	38 × 89	2.23	2.03	1.77	1.95	1.77	1.55	1.77	1.61	1.41
		38 × 140	3.51	3.19	2.79	3.07	2.79	2.43	2.79	2.53	2.21
		38 × 184	4.61	4.19	3.66	4.03	3.66	3.20	3.66	3.33	2.91
		38 × 235	5.89	5.35	4.68	5.15	4.68	4.09	4.68	4.25	3.68
		38 × 286	7.17	6.52	5.58	6.26	5.69	4.80	5.69	5.17	4.27
	No. 3	38 × 89	2.18	1.98	1.73	1.90	1.73	1.50	1.73	1.57	1.33
		38 × 140	3.42	3.05	2.49	2.99	2.62	2.14	2.69	2.33	1.90
		38 × 184	4.28	3.71	3.03	3.68	3.19	2.60	3.28	2.84	2.32
		38 × 235	5.23	4.53	3.70	4.50	3.90	3.18	4.01	3.47	2.83
		38 × 286	6.07	5.26	4.29	5.22	4.52	3.69	4.65	4.03	3.29
	Construction	38 × 89	2.18	1.98	1.73	1.90	1.73	1.51	1.73	1.57	1.37
	Standard	38 × 89	2.09	1.81	1.48	1.80	1.56	1.27	1.60	1.38	1.13

Table A-5
Maximum Spans for Roof Joists – Specified Roof Snow Loads 2.5 and 3.0 kPa

Forming Part of Sentence 9.23.4.2.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9
Commercial Designation	Grade	Joist Size, mm	Maximum Span, m					
			Specified Snow Load, kPa					
			2.5			3.0		
			Joist Spacing, mm			Joist Spacing, mm		
			300	400	600	300	400	600
Douglas Fir – Larch (includes Douglas Fir and Western Larch)	Select Structural	38 × 89	1.99	1.81	1.58	1.88	1.71	1.49
		38 × 140	3.14	2.85	2.49	2.95	2.68	2.34
		38 × 184	4.12	3.75	3.27	3.88	3.53	3.08
		38 × 235	5.27	4.79	4.18	4.96	4.50	3.93
		38 × 286	6.41	5.82	5.09	6.03	5.48	4.79
	No. 1 and No. 2	38 × 89	1.91	1.74	1.52	1.80	1.63	1.43
		38 × 140	3.01	2.73	2.39	2.83	2.57	2.25
		38 × 184	3.95	3.59	3.14	3.72	3.38	2.90
		38 × 235	5.05	4.59	3.84	4.75	4.32	3.55
		38 × 286	6.14	5.46	4.46	5.78	5.05	4.12
	No. 3	38 × 89	1.74	1.50	1.23	1.60	1.39	1.13
		38 × 140	2.48	2.15	1.75	2.29	1.98	1.62
		38 × 184	3.01	2.61	2.13	2.79	2.41	1.97
		38 × 235	3.69	3.19	2.61	3.41	2.95	2.41
		38 × 286	4.28	3.70	3.03	3.95	3.42	2.79
	Construction	38 × 89	1.85	1.68	1.47	1.74	1.58	1.38
	Standard	38 × 89	1.68	1.45	1.19	1.55	1.34	1.10
Hem – Fir (includes Western Hemlock and Amabilis Fir)	Select Structural	38 × 89	1.97	1.79	1.56	1.85	1.68	1.47
		38 × 140	3.10	2.81	2.46	2.91	2.65	2.31
		38 × 184	4.07	3.70	3.23	3.83	3.48	3.04
		38 × 235	5.20	4.72	4.12	4.89	4.44	3.88
		38 × 286	6.32	5.75	5.02	5.95	5.41	4.72
	No. 1 and No. 2	38 × 89	1.91	1.74	1.52	1.80	1.63	1.43
		38 × 140	3.01	2.73	2.39	2.83	2.57	2.25
		38 × 184	3.95	3.59	3.14	3.72	3.38	2.95
		38 × 235	5.05	4.59	4.01	4.75	4.32	3.72
		38 × 286	6.14	5.58	4.68	5.78	5.25	4.32
	No. 3	38 × 89	1.85	1.68	1.47	1.74	1.58	1.38
		38 × 140	2.91	2.65	2.16	2.74	2.45	2.00
		38 × 184	3.72	3.22	2.63	3.44	2.98	2.43
		38 × 235	4.55	3.94	3.22	4.20	3.64	2.97
		38 × 286	5.28	4.57	3.73	4.88	4.22	3.45
	Construction	38 × 89	1.85	1.68	1.47	1.74	1.58	1.38
	Standard	38 × 89	1.76	1.52	1.24	1.62	1.40	1.15
Spruce – Pine – Fir (includes Spruce (all species except Coast Sitka Spruce) Jack Pine, Lodgepole Pine, Balsam Fir and Alpine Fir)	Select Structural	38 × 89	1.88	1.71	1.49	1.77	1.61	1.41
		38 × 140	2.96	2.69	2.35	2.79	2.53	2.21
		38 × 184	3.89	3.54	3.09	3.66	3.33	2.91
		38 × 235	4.97	4.52	3.94	4.6[illegible]	4.25	3.71
		38 × 286	6.05	5.50	4.80	5.69	5.17	4.52
	No. 1 and No. 2	38 × 89	1.82	1.65	1.44	1.71	1.56	1.36
		38 × 140	2.86	2.60	2.27	2.69	2.45	2.14
		38 × 184	3.76	3.42	2.99	3.54	3.22	2.81
		38 × 235	4.81	4.37	3.82	4.52	4.11	3.59
		38 × 286	5.85	5.31	4.64	5.50	5.00	4.37
	No. 3	38 × 89	1.79	1.62	1.42	1.68	1.53	1.34
		38 × 140	2.81	2.56	2.16	2.65	2.40	2.005
		38 × 184	3.70	3.22	2.63	3.44	2.98	2.43
		38 × 235	4.55	3.94	3.22	4.20	3.64	2.97
		38 × 286	5.28	4.57	3.73	4.88	4.22	3.45
	Construction	38 × 89	1.79	1.62	1.42	1.68	1.53	1.34
	Standard	38 × 89	1.72	1.56	1.29	1.62	1.46	1.19

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9
Commercial Designation	Grade	Joist Size, mm	Maximum Span, m					
			Specified Snow Load, kPa					
			2.5			3.0		
			Joist Spacing, mm			Joist Spacing, mm		
			300	400	600	300	400	600
Northern Species (includes any Canadian Species covered by the NLGA Standard Grading Rules	Select Structural	38 × 89	1.68	1.53	1.34	1.58	1.44	1.26
		38 × 140	2.65	2.40	2.10	2.49	2.26	1.98
		38 × 184	3.48	3.16	2.76	3.27	2.97	2.60
		38 × 235	4.44	4.04	3.53	4.18	3.80	3.32
		38 × 286	5.41	4.91	4.29	5.09	4.62	4.04
	No. 1 and No. 2	38 × 89	1.64	1.49	1.31	1.55	1.41	1.23
		38 × 140	2.59	2.35	2.05	2.43	2.21	1.93
		38 × 184	3.40	3.09	2.70	3.20	2.91	2.53
		38 × 235	4.34	3.94	3.35	4.09	3.71	3.10
		38 × 286	5.28	4.76	3.89	4.97	4.40	3.59
	No. 3	38 × 89	1.60	1.46	1.21	1.51	1.37	1.12
		38 × 140	2.45	2.12	1.73	2.26	1.96	1.60
		38 × 184	2.98	2.58	2.11	2.76	2.39	1.95
		38 × 235	3.65	3.16	2.58	3.37	2.92	2.38
		38 × 286	4.23	3.66	2.99	3.91	3.39	2.76
	Construction	38 × 89	1.60	1.46	1.27	1.51	1.37	1.20
	Standard	38 × 89	1.46	1.26	1.03	1.34	1.16	0.95

Table A-6
Maximum Spans for Roof Rafters – Specified Roof Snow Loads 1.0 to 2.0 kPa

Forming Part of Sentence 9.23.4.2.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COL. 4	COL. 5	COL. 6	COL. 7	COL. 8	COL. 9	COL. 10	COL. 11	COL. 12
Commercial Designation	Grade	Rafter Size, mm	Maximum Span, m								
			Specified Snow Load, kPa								
			1.0			1.5			2.0		
			Rafter Spacing, mm			Rafter Spacing, mm			Rafter Spacing, mm		
			300	400	600	300	400	600	300	400	600
Douglas Fir – Larch (includes Douglas Fir and Western Larch)	Select Structural	38 × 89	3.41	3.10	2.71	2.98	2.71	2.37	2.71	2.46	2.15
		38 × 140	5.37	4.88	4.26	4.69	4.26	3.72	4.26	3.87	3.38
		38 × 184	7.05	6.41	5.60	6.16	5.60	4.89	5.60	5.09	4.44
		38 × 235	9.01	8.18	7.15	7.87	7.15	6.24	7.15	6.49	5.62
		38 × 286	10.96	9.96	8.70	9.58	8.70	7.40	8.70	7.90	6.52
	No. 1 and No. 2	38 × 89	3.27	2.97	2.59	2.86	2.59	2.27	2.59	2.36	2.06
		38 × 140	5.14	4.67	3.95	4.49	4.08	3.34	4.08	3.60	2.94
		38 × 184	6.76	5.88	4.80	5.74	4.97	4.06	5.06	4.38	3.58
		38 × 235	8.30	7.19	5.87	7.02	6.08	4.96	6.19	5.36	4.38
		38 × 286	9.63	8.34	6.81	8.14	7.05	5.76	7.18	6.22	5.08
	No. 3	38 × 89	2.65	2.30	1.87	2.24	1.94	1.58	1.98	1.71	1.40
		38 × 140	3.78	3.28	2.68	3.20	2.77	2.26	2.82	2.44	1.99
		38 × 184	4.61	3.99	3.26	3.89	3.37	2.75	3.43	2.97	2.43
		38 × 235	5.63	4.88	3.98	4.76	4.12	3.37	4.20	3.64	2.97
		38 × 286	6.53	5.66	4.62	5.52	4.78	3.91	4.87	4.22	3.44
	Construction	38 × 89	3.17	2.88	2.42	2.77	2.50	2.04	2.51	2.21	1.80
	Standard	38 × 89	2.56	2.22	1.81	2.17	1.88	1.53	1.91	1.65	1.35
Hem – Fir (includes Western Hemlock and Amabilis Fir)	Select Structural	38 × 89	3.36	3.06	2.67	2.94	2.67	2.33	2.67	2.43	2.12
		38 × 140	5.29	4.81	4.20	4.62	4.20	3.67	4.20	3.82	3.33
		38 × 184	6.96	6.32	5.52	6.08	5.52	4.82	5.52	5.02	4.38
		38 × 235	8.88	8.07	7.05	7.76	7.05	6.16	7.05	6.41	5.54
		38 × 286	10.81	9.82	8.58	9.45	8.58	7.28	8.58	7.80	6.42
	No. 1 and No. 2	38 × 89	3.27	2.97	2.59	2.86	2.59	2.27	2.59	2.36	2.06
		38 × 140	5.14	4.67	4.08	4.49	4.08	3.50	4.08	3.71	3.08
		38 × 184	6.76	6.14	5.04	5.90	5.21	4.26	5.31	4.60	3.75
		38 × 235	8.63	7.54	6.16	7.36	6.37	5.20	6.49	5.62	4.59
		38 × 286	10.11	8.75	7.15	8.54	7.40	6.04	7.53	6.52	5.33

COLUMN 1	COLUMN 2	COLUMN 3	COL. 4	COL. 5	COL. 6	COL. 7	COL. 8	COL. 9	COL. 10	COL. 11	COL. 12
Commercial Designation	Grade	Rafter Size, mm	Maximum Span, m								
			Specified Snow Load, kPa								
			1.0			1.5			2.0		
			Rafter Spacing, mm			Rafter Spacing, mm			Rafter Spacing, mm		
			300	400	600	300	400	600	300	400	600
	No. 3	38 × 89	3.17	2.83	2.31	2.76	2.39	1.95	2.44	2.11	1.72
		38 × 140	4.67	4.04	3.30	3.95	3.42	2.79	3.48	3.01	2.46
		38 × 184	5.68	4.92	4.02	4.80	4.16	3.40	4.23	3.67	2.99
		38 × 235	6.95	6.02	4.91	5.87	5.08	4.15	5.18	4.48	3.66
		38 × 286	8.06	6.98	5.70	6.81	5.90	4.82	6.01	5.20	4.25
	Construction	38 × 89	3.17	2.88	2.51	2.77	2.51	2.14	2.51	2.28	1.89
	Standard	38 × 89	2.68	2.32	1.90	2.27	1.96	1.60	2.00	1.73	1.41
Spruce - Pine - Fir (includes Spruce (all species except Coast Sitka Spruce) Jack Pine, Lodgepole Pine, Balsam Fir and Alpine Fir)	Select Structural	38 × 89	3.22	2.92	2.55	2.81	2.55	2.23	2.55	2.32	2.03
		38 × 140	5.06	4.60	4.02	4.42	4.02	3.51	4.02	3.65	3.19
		38 × 184	6.65	6.05	5.28	5.81	5.28	4.61	5.28	4.80	4.19
		38 × 235	8.50	7.72	6.74	7.42	6.74	5.89	6.74	6.13	5.35
		38 × 286	10.34	9.40	8.21	9.03	8.21	7.17	8.21	7.46	6.52
	No. 1 and No. 2	38 × 89	3.11	2.83	2.47	2.72	2.47	2.16	2.47	2.24	1.96
		38 × 140	4.90	4.45	3.89	4.28	3.89	3.40	3.89	3.53	3.08
		38 × 184	6.44	5.85	5.11	5.62	5.11	4.41	5.11	4.64	3.89
		38 × 235	8.22	7.47	6.38	7.18	6.52	5.39	6.52	5.82	4.75
		38 × 286	10.00	9.06	7.40	8.74	7.66	6.25	7.80	6.76	5.52
	No. 3	38 × 89	3.06	2.78	2.31	2.67	2.39	1.95	2.43	2.11	1.72
		38 × 140	4.67	4.04	3.30	3.95	3.42	2.79	3.48	3.01	2.46
		38 × 184	5.68	4.92	4.02	4.80	4.16	3.40	4.23	3.67	2.99
		38 × 235	6.95	6.02	4.91	5.87	5.08	4.15	5.18	4.48	3.66
		38 × 286	8.06	6.98	5.70	6.81	5.90	4.82	6.01	5.20	4.25
	Construction	38 × 89	3.06	2.78	2.43	2.67	2.43	2.12	2.43	2.20	1.93
	Standard	38 × 89	2.78	2.41	1.97	2.35	2.04	1.66	2.07	1.79	1.47
Northern Species (includes any Canadian species covered by the NLGA Standard Grading Rules)	Select Structural	38 × 89	2.88	2.61	2.28	2.51	2.28	1.99	2.28	2.07	1.81
		38 × 140	4.53	4.11	3.59	3.95	3.59	3.14	3.59	3.26	2.85
		38 × 184	5.95	5.40	4.72	5.20	4.72	4.12	4.72	4.29	3.68
		38 × 235	7.60	6.90	6.03	6.64	6.03	5.11	6.03	5.48	4.51
		38 × 286	9.25	8.40	7.01	8.08	7.26	5.93	7.34	6.40	5.23
	No. 1 and No. 2	38 × 89	2.81	2.55	2.23	2.46	2.23	1.95	2.23	2.03	1.77
		38 × 140	4.42	4.02	3.44	3.86	3.51	2.91	3.51	3.14	2.56
		38 × 184	5.81	5.13	4.19	5.00	4.33	3.54	4.41	3.82	3.12
		38 × 235	7.24	6.27	5.12	6.12	5.30	4.33	5.40	4.67	3.82
		38 × 286	8.40	7.27	5.94	7.10	6.15	5.02	6.26	5.42	4.43
	No. 3	38 × 89	2.62	2.27	1.85	2.22	1.92	1.57	1.95	1.69	1.38
		38 × 140	3.74	3.24	2.65	3.16	2.74	2.24	2.79	2.42	1.97
		38 × 184	4.56	3.94	3.22	3.85	3.33	2.72	3.40	2.94	2.40
		38 × 235	5.57	4.82	3.94	4.71	4.08	3.33	4.15	3.60	2.94
		38 × 286	6.46	5.60	4.57	5.46	4.73	3.86	4.82	4.17	3.41
	Construction	38 × 89	2.74	2.49	2.11	2.40	2.18	1.90	2.18	1.93	1.57
	Standard	38 × 89	2.22	1.93	1.57	1.88	1.63	1.33	1.66	1.44	1.17

Table A-7
Maximum Spans for Roof Rafters – Specified Roof Snow Loads 2.5 and 3.0 kPa

Forming Part of Sentence 9.23.4.2.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9
Commercial Designation	Grade	Rafter Size, mm	Maximum Span, m					
			Specified Snow Load, kPa					
			2.5			3.0		
			Rafter Spacing, mm			Rafter Spacing, mm		
			300	400	600	300	400	600
Douglas Fir – Larch (includes Douglas Fir and Western Larch)	Select Structural	38 × 89	2.51	2.28	1.99	2.37	2.15	1.88
		38 × 140	3.95	3.59	3.14	3.72	3.38	2.95
		38 × 184	5.20	4.72	4.12	4.89	4.44	3.83
		38 × 235	6.64	6.03	5.08	6.24	5.67	4.68
		38 × 286	8.08	7.23	5.90	7.60	6.65	5.43
	No. 1 and No. 2	38 × 89	2.41	2.19	1.86	2.27	2.06	1.71
		38 × 140	3.76	3.26	2.66	3.46	3.00	2.45
		38 × 184	4.58	3.96	3.24	4.21	3.65	2.98
		38 × 235	5.60	4.85	3.96	5.15	4.46	3.64
		38 × 286	6.50	5.63	4.59	5.98	5.17	4.23
	No. 3	38 × 89	1.79	1.55	1.26	1.64	1.42	1.16
		38 × 140	2.55	2.21	1.80	2.35	2.03	1.66
		38 × 184	3.10	2.69	2.20	2.86	2.47	2.02
		38 × 235	3.80	3.29	2.68	3.49	3.02	2.47
		38 × 286	4.41	3.82	3.12	4.05	3.51	2.87
	Construction	38 × 89	2.30	2.00	1.63	2.12	1.84	1.50
	Standard	38 × 89	1.73	1.50	1.22	1.59	1.38	1.12
Hem – Fir (includes Western Hemlock and Amabilis Fir)	Select Structural	38 × 89	2.48	2.25	1.97	2.33	2.12	1.85
		38 × 140	3.90	3.54	3.10	3.67	3.33	2.91
		38 × 184	5.13	4.66	4.07	4.82	4.38	3.77
		38 × 235	6.55	5.95	5.01	6.16	5.60	4.61
		38 × 286	7.97	7.12	5.81	7.50	6.55	5.34
	No. 1 and No. 2	38 × 89	2.41	2.19	1.91	2.27	2.06	1.80
		38 × 140	3.79	3.42	2.79	3.57	3.14	2.57
		38 × 184	4.80	4.16	3.40	4.42	3.83	3.12
		38 × 235	5.87	5.08	4.15	5.40	4.68	3.82
		38 × 286	6.81	5.90	4.82	6.27	5.43	4.43
	No. 3	38 × 89	2.21	1.91	1.56	2.03	1.76	1.43
		38 × 140	3.15	2.73	2.23	2.90	2.51	2.05
		38 × 184	3.83	3.32	2.71	3.52	3.05	2.49
		38 × 235	4.68	4.06	3.31	4.31	3.73	3.05
		38 × 286	5.53	4.71	3.84	5.00	4.33	3.54
	Commercial	38 × 89	2.33	2.09	1.71	2.20	1.93	1.57
	Standard	38 × 89	1.81	1.57	1.28	1.66	1.44	1.18
Spruce – Pine – Fir (includes Spruce (all species except Coast Sitka Spruce) Jack Pine, Lodgepole Pine, Balsam Fir and Alpine Fir)	Select Structural	38 × 89	2.37	2.15	1.88	2.23	2.03	1.77
		38 × 140	3.73	3.39	2.96	3.51	3.19	2.79
		38 × 184	4.90	4.45	3.89	4.61	4.19	3.66
		38 × 235	6.26	5.69	4.97	5.89	5.35	4.68
		38 × 286	7.62	6.92	5.90	7.17	6.52	5.43
	No. 1 and No. 2	38 × 89	2.29	2.08	1.82	2.16	1.96	1.71
		38 × 140	3.61	3.28	2.86	3.40	3.08	2.66
		38 × 184	4.74	4.31	3.52	4.46	3.96	3.23
		38 × 235	6.06	5.27	4.30	5.59	4.84	3.96
		38 × 286	7.06	6.11	4.99	6.49	5.62	4.59
	No. 3	38 × 89	2.21	1.91	1.56	2.03	1.76	1.43
		38 × 140	3.15	2.73	2.23	2.90	2.51	2.05
		38 × 184	3.83	3.32	2.71	3.52	3.05	2.49
		38 × 235	4.68	4.06	3.31	4.31	3.73	3.05
		38 × 286	5.43	4.71	3.84	5.00	4.33	3.54
	Construction	38 × 89	2.25	2.05	1.77	2.12	1.93	1.63
	Standard	38 × 89	1.87	1.62	1.33	1.72	1.49	1.22

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9
Commercial Designation	Grade	Rafter Size, mm	Maximum Span, m					
			Specified Snow Load, kPa					
			2.5			3.0		
			Rafter Spacing, mm			Rafter Spacing, mm		
			300	400	600	300	400	600
Northern Species (includes any Canadian species covered by the NLGA Standard Grading Rules)	Select Structural	38 × 89	2.12	1.93	1.68	1.99	1.81	1.58
		38 × 140	3.33	3.03	2.65	3.14	2.85	2.49
		38 × 184	4.38	3.98	3.33	4.12	3.75	3.07
		38 × 235	5.60	4.99	4.08	5.27	4.59	3.75
		38 × 286	6.69	5.79	4.73	6.15	5.33	4.35
	No. 1 and No. 2	38 × 89	2.07	1.88	1.62	1.95	1.77	1.49
		38 × 140	3.26	2.84	2.32	3.02	2.61	2.13
		38 × 184	3.99	3.46	2.82	3.67	3.18	2.60
		38 × 235	4.88	4.23	3.45	4.49	3.89	3.17
		38 × 286	5.66	4.90	4.00	5.21	4.51	3.68
	No. 3	38 × 89	1.77	1.53	1.25	1.63	1.41	1.15
		38 × 140	2.52	2.19	1.78	2.32	2.01	1.64
		38 × 184	3.07	2.66	2.17	2.82	2.45	2.00
		38 × 235	3.76	3.25	2.66	3.45	2.99	2.44
		38 × 286	4.36	3.77	3.08	4.01	3.47	2.83
	Construction	38 × 89	2.01	1.74	1.42	1.85	1.60	1.31
	Standard	38 × 89	1.50	1.30	1.06	1.38	1.19	0.98

Table A-8
Maximum Spans for Built-up Floor Beams Supporting not more than One Floor(1)(2)

Forming Part of Sentence 9.23.4.2.(3)

COLUMN 1	COLUMN 2	COLUMN 3	COL. 4	COL. 5	COL. 6	COL. 7	COL. 8	COL. 9	COL. 10	COL. 11	COL. 12
Commercial Designation	Grade	Supported Length, mm(3)(4)	Maximum Span, m(5)(6)								
			Size of Built-up Beam, mm								
			3 – 38 × 184	4 – 38 × 184	5 – 38 × 184	3 – 38 × 235	4 – 38 × 235	5 – 38 × 235	3 – 38 × 286	4 – 38 × 286	5 – 38 × 286
Douglas Fir – Larch (includes Douglas Fir and Western Larch)	Select Structural	2.4	3.36	3.70	3.99	4.30	4.73	5.09	5.23	5.66	5.99
		3.0	3.12	3.44	3.70	3.99	4.39	4.73	4.84	5.34	5.66
		3.6	2.94	3.23	3.48	3.75	4.13	4.45	4.41	5.03	5.41
		4.2	2.79	3.07	3.31	3.52	3.92	4.23	4.09	4.72	5.14
		4.8	2.67	2.94	3.17	3.29	3.75	4.04	3.82	4.41	4.92
		5.4	2.54	2.83	3.04	3.11	3.59	3.89	3.60	4.16	4.65
		6.0	2.41	2.73	2.94	2.95	3.40	3.75	3.42	3.95	4.41
	No. 1 and No. 2	2.4	2.97	3.42	3.82	3.63	4.19	4.68	4.21	4.86	5.43
		3.0	2.65	3.06	3.42	3.24	3.75	4.19	3.76	4.35	4.86
		3.6	2.42	2.80	3.13	2.96	3.42	3.82	3.44	3.97	4.44
		4.2	2.24	2.59	2.89	2.74	3.17	3.54	3.18	3.67	4.11
		4.8	2.10	2.42	2.71	2.56	2.96	3.31	2.98	3.44	3.84
		5.4	1.98	2.28	2.55	2.42	2.79	3.12	2.81	3.24	3.62
		6.0	1.88	2.17	2.42	2.29	2.65	2.96	2.66	3.07	3.44
Hem – Fir (includes Western Hemlock and Amabilis Fir)	Select Structural	2.4	3.32	3.65	3.93	4.24	4.66	5.03	5.16	5.61	5.93
		3.0	3.08	3.39	3.65	3.93	4.33	4.66	4.76	5.27	5.61
		3.6	2.90	3.19	3.44	3.70	4.08	4.39	4.35	4.96	5.34
		4.2	2.75	3.03	3.27	3.47	3.87	4.17	4.02	4.65	5.07
		4.8	2.63	2.90	3.12	3.24	3.70	3.99	3.66	4.35	4.85
		5.4	2.49	2.79	3.00	2.95	3.53	3.83	3.32	4.10	4.58
		6.0	2.28	2.69	2.90	2.70	3.35	3.70	3.04	3.87	4.35
	No. 1 and No. 2	2.4	3.11	3.55	3.82	3.80	4.39	4.88	4.41	5.10	5.70
		3.0	2.78	3.21	3.55	3.40	3.93	4.39	3.95	4.56	5.10
		3.6	2.54	2.93	3.28	3.11	3.59	4.01	3.60	4.16	4.65
		4.2	2.35	2.72	3.04	2.88	3.32	3.71	3.34	3.85	4.31
		4.8	2.20	2.54	2.84	2.69	3.11	3.47	3.12	3.60	4.03
		5.4	2.07	2.39	2.68	2.54	2.93	3.27	2.94	3.40	3.80
		6.0	1.97	2.27	2.54	2.41	2.78	3.11	2.79	3.22	3.60

COLUMN 1	COLUMN 2	COLUMN 3	COL. 4	COL. 5	COL. 6	COL. 7	COL. 8	COL. 9	COL. 10	COL. 11	COL. 12
Commercial Designation	Grade	Supported Length, mm(3)(4)	Maximum Span, m(5)(6)								
			Size of Built-up Beam, mm								
			3 – 38 × 184	4 – 38 × 184	5 – 38 × 184	3 – 38 × 235	4 – 38 × 235	5 – 38 × 235	3 – 38 × 286	4 – 38 × 286	5 – 38 × 286
Spruce – Pine – Fir (includes Spruce (all species except Coast Sitka Spruce) Jack Pine, Lodgepole Pine, Balsam Fir and Alpine Fir)	Select Structural	2.4	3.17	3.49	3.76	4.05	4.46	4.81	4.93	5.42	5.73
		3.0	2.95	3.24	3.49	3.76	4.14	4.46	4.58	5.04	5.42
		3.6	2.77	3.05	3.29	3.54	3.90	4.20	4.31	4.74	5.11
		4.2	2.63	2.90	3.12	3.36	3.70	3.99	4.09	4.51	4.85
		4.8	2.52	2.77	2.99	3.22	3.54	3.81	3.82	4.31	4.64
		5.4	2.42	2.67	2.87	3.09	3.41	3.67	3.60	4.14	4.46
		6.0	2.34	2.57	2.77	2.95	3.29	3.54	3.32	3.95	4.31
	No. 1 and No. 2	2.4	3.07	3.38	3.64	3.92	4.32	4.65	4.57	5.25	5.59
		3.0	2.85	3.14	3.38	3.52	4.01	4.32	4.09	4.72	5.25
		3.6	2.63	2.95	3.18	3.22	3.71	4.06	3.73	4.31	4.82
		4.2	2.44	2.80	3.02	2.98	3.44	3.84	3.46	3.99	4.46
		4.8	2.28	2.63	2.89	2.79	3.22	3.60	3.23	3.73	4.17
		5.4	2.15	2.48	2.77	2.63	3.03	3.39	3.05	3.52	3.93
		6.0	2.04	2.35	2.63	2.49	2.88	3.22	2.89	3.34	3.73
Northern Species (includes any Canadian species covered by the NLGA Standard GradingRules)	Select Structural	2.4	2.84	3.12	3.36	3.62	3.99	4.30	4.33	4.85	5.23
		3.0	2.63	2.90	3.12	3.34	3.70	3.99	3.88	4.47	4.85
		3.6	2.48	2.73	2.94	3.05	3.48	3.75	3.54	4.08	4.57
		4.2	2.31	2.59	2.79	2.82	3.26	3.57	3.28	3.78	4.23
		4.8	2.16	2.48	2.67	2.64	3.05	3.41	3.06	3.54	3.96
		5.4	2.04	2.35	2.57	2.49	2.87	3.21	2.89	3.34	3.73
		6.0	1.93	2.23	2.48	2.36	2.73	3.05	2.74	3.16	3.54
	No. 1 and No. 2	2.4	2.59	2.99	3.29	3.16	3.65	4.08	3.67	4.24	4.74
		3.0	2.31	2.67	2.99	2.83	3.27	3.65	3.28	3.79	4.24
		3.6	2.11	2.44	2.73	2.58	2.98	3.33	3.00	3.46	3.87
		4.2	1.95	2.26	2.52	2.39	2.76	3.09	2.77	3.20	3.58
		4.8	1.83	2.11	2.36	2.24	2.58	2.89	2.59	3.00	3.35
		5.4	1.72	1.99	2.23	2.11	2.43	2.72	2.45	2.82	3.16
		6.0	1.64	1.89	2.11	2.00	2.31	2.58	2.32	2.68	3.00

Notes to Table A-8:

(1) Beam spans apply only where the floors serve residential areas as described in Table 4.1.5.3., or the uniformly distributed *live load* on the floors does not exceed that specified for residential areas as described in Table 4.1.5.3.

(2) When the floors have a concrete topping of not more than 51 mm, the spans must be multiplied by 0.8

(3) Supported length means half the sum of the joists spans on both sides of the beam.

(4) Straight interpolation may be used for other supported lengths.

(5) Spans are clear spans between supports. For total span, add two bearing lengths.

(6) 3-ply beams with supported lengths greater than 4.2 m require minimum bearing length of 114 mm. All other beams require minimum bearing length of 76 mm.

Table A-9
Maximum Spans for Built-up Floor Beams Supporting not more than Two Floors(1)(2)

Forming Part of Sentence 9.23.4.2.(3)

COLUMN 1	COLUMN 2	COLUMN 3	COL. 4	COL. 5	COL. 6	COL. 7	COL. 8	COL. 9	COL. 10	COL. 11	COL. 12
Commercial Designation	Grade	Supported Length, mm(3)(4)	Maximum Span, m(5)(6)								
			Size of Built-up Beam, mm								
			3 – 38 × 184	4 – 38 × 184	5 – 38 × 184	3 – 38 × 235	4 – 38 × 235	5 – 38 × 235	3 – 38 × 286	4 – 38 × 286	5 – 38 × 286
Douglas Fir – Larch (includes Douglas Fir and Western Larch)	Select Structural	2.4	2.80	3.08	3.32	3.49	3.93	4.24	4.05	4.67	5.16
		3.0	2.55	2.86	3.08	3.12	3.60	3.93	3.62	4.18	4.67
		3.6	2.33	2.69	2.90	2.85	3.29	3.68	3.30	3.82	4.27
		4.2	2.16	2.49	2.75	2.64	3.04	3.40	2.99	3.53	3.95
		4.8	2.00	2.33	2.60	2.38	2.85	3.18	2.69	3.30	3.69
		5.4	1.82	2.20	2.45	2.17	2.68	3.00	2.45	3.08	3.48
		6.0	1.67	2.08	2.33	2.00	2.51	2.85	2.26	2.83	3.30

COLUMN 1	COLUMN 2	COLUMN 3	COL. 4	COL. 5	COL. 6	COL. 7	COL. 8	COL. 9	COL. 10	COL. 11	COL. 12
Commercial Designation	Grade	Supported Length, mm[3][4]	Maximum Span, m[5][6]								
			Size of Built-up Beam, mm								
			3 – 38 × 184	4 – 38 × 184	5 – 38 × 184	3 – 38 × 235	4 – 38 × 235	5 – 38 × 235	3 – 38 × 286	4 – 38 × 286	5 – 38 × 286
	No. 1 and No.2	2.4	2.22	2.56	2.87	2.72	3.14	3.51	3.15	3.64	4.07
		3.0	1.99	2.29	2.56	2.43	2.80	3.14	2.82	3.25	3.64
		3.6	1.81	2.09	2.34	2.22	2.56	2.86	2.57	2.97	3.32
		4.2	1.68	1.94	2.17	2.05	2.37	2.65	2.38	2.75	3.07
		4.8	1.57	1.81	2.03	1.92	2.22	2.48	2.23	2.57	2.88
		5.4	1.48	1.71	1.91	1.81	2.09	2.34	2.10	2.43	2.71
		6.0	1.40	1.62	1.81	1.72	1.98	2.22	1.99	2.30	2.57
Hem – Fir (includes Western Hemlock and Amabilis Fir)	Select Structural	2.4	2.76	3.04	3.27	3.43	3.88	4.18	3.99	4.60	5.09
		3.0	2.51	2.82	3.04	2.97	3.55	3.88	3.34	4.12	4.60
		3.6	2.15	2.65	2.86	2.56	3.24	3.62	2.88	3.65	4.20
		4.2	1.90	2.40	2.72	2.26	2.85	3.35	2.55	3.21	3.87
		4.8	1.70	2.15	2.56	2.03	2.56	3.08	2.30	2.88	3.46
		5.4	1.56	1.95	2.35	1.86	2.32	2.79	2.11	2.62	3.14
		6.0	1.44	1.79	2.15	1.72	2.14	2.56	1.96	2.42	2.88
	No. 1 and No.2	2.4	2.33	2.69	3.01	2.85	3.29	3.68	3.30	3.82	4.27
		3.0	2.08	2.41	2.69	2.55	2.94	3.29	2.96	3.41	3.82
		3.6	1.90	2.20	2.45	2.33	2.68	3.00	2.70	3.12	3.48
		4.2	1.76	2.03	2.27	2.15	2.49	2.78	2.50	2.88	3.22
		4.8	1.65	1.90	2.13	2.01	2.33	2.60	2.30	2.70	3.02
		5.4	1.55	1.79	2.00	1.86	2.19	2.45	2.11	2.54	2.84
		6.0	1.44	1.70	1.90	1.72	2.08	2.33	1.96	2.41	2.70
Spruce – Pine – Fir (includes Spruce (all species except Coast Sitka Spruce) Jack Pine, Lodgepole Pine, Balsam Fir and Alpine Fir)	Select Structural	2.4	2.64	2.91	3.13	3.37	3.71	4.00	4.05	4.52	4.87
		3.0	2.45	2.70	2.91	3.12	3.45	4.71	3.62	4.18	4.52
		3.6	2.31	2.54	2.73	2.79	3.24	3.49	3.14	3.82	4.25
		4.2	2.07	2.41	2.60	2.46	3.04	3.32	2.77	3.50	3.95
		4.8	1.85	2.31	2.48	2.21	2.79	3.17	2.50	3.14	3.69
		5.4	1.69	2.13	2.39	2.02	2.53	3.00	2.28	2.85	3.42
		6.0	1.56	1.95	2.31	1.86	2.32	2.79	2.11	2.62	3.14
	No. 1 and No.2	2.4	2.41	2.79	3.03	2.95	3.41	3.81	3.42	3.95	4.42
		3.0	2.16	2.49	2.79	2.64	3.05	3.41	3.06	3.53	3.95
		3.6	1.97	2.27	2.54	2.41	2.78	3.11	2.79	3.23	3.61
		4.2	1.82	2.11	2.35	2.23	2.57	2.88	2.59	2.99	3.34
		4.8	1.71	1.97	2.20	2.09	2.41	2.69	2.42	2.79	3.12
		5.4	1.61	1.86	2.08	1.97	2.27	2.54	2.28	2.63	2.95
		6.0	1.53	1.76	1.97	1.86	2.15	2.41	2.11	2.50	2.79
Northern Species (includes any Canadian species covered by the NLGA Standard Grading Rules)	Select Structural	2.4	2.29	2.60	2.80	2.80	3.23	3.57	3.24	3.75	4.19
		3.0	2.04	2.36	2.60	2.50	2.89	3.23	2.90	3.35	3.75
		3.6	1.87	2.16	2.41	2.28	2.64	2.95	2.65	3.06	3.42
		4.2	1.73	2.00	2.23	2.11	2.44	2.73	2.45	2.83	3.17
		4.8	1.62	1.87	2.09	1.98	2.28	2.55	2.29	2.65	2.96
		5.4	1.52	1.76	1.97	1.86	2.15	2.41	2.11	2.50	2.79
		6.0	1.44	1.67	1.87	1.72	2.04	2.28	1.96	2.37	2.65
	No. 1 and No.2	2.4	1.94	2.24	2.50	2.37	2.73	3.06	2.75	3.17	3.55
		3.0	1.73	2.00	2.24	2.12	2.44	2.73	2.46	2.84	3.17
		3.6	1.58	1.83	2.04	1.93	2.23	2.50	2.24	2.59	2.90
		4.2	1.46	1.69	1.89	1.79	2.07	2.31	2.08	2.40	2.68
		4.8	1.37	1.58	1.77	1.67	1.93	2.16	1.94	2.24	2.51
		5.4	1.29	1.49	1.67	1.58	1.82	2.04	1.83	2.11	2.36
		6.0	1.22	1.41	1.58	1.50	1.73	1.93	1.74	2.01	2.24

Notes to Table A-9:

[1] Beam spans apply only where the floors serve residential areas as described in Table 4.1.5.3., or the uniformly distributed *live load* on the floors does not exceed that specified for residential areas as described in Table 4.1.5.3.

[2] When the floors have a concrete topping of not more than 51 mm, the spans must be multiplied by 0.8

[3] Supported length means half the sum of the joists spans on both sides of the beam.

[4] Straight interpolation may be used for other supported lengths.

(5) Spans are clear spans between supports. For total span, add two bearing lengths.

(6) 3-ply beams require minimum bearing length of 114 mm. 4-ply and 5-ply beams with supported lengths greater than 3 m require minimum bearing length of 114 mm. All other beams require minimum bearing length of 76 mm.

Table A-10
Maximum Spans for Built-up Floor Beams Supporting not more than Three Floors(1)(2)

Forming Part of Sentence 9.23.4.2.(3)

COLUMN 1	COLUMN 2	COLUMN 3	COL. 4	COL. 5	COL. 6	COL. 7	COL. 8	COL. 9	COL. 10	COL. 11	COL. 12
Commercial Designation	Grade	Supported Length, mm(3)(4)	Maximum Span, m(5)(6)								
			Size of Built-up Beam, mm								
			3 – 38 × 184	4 – 38 × 184	5 – 38 × 184	3 – 38 × 235	4 – 38 × 235	5 – 38 × 235	3 – 38 × 286	4 – 38 × 286	5 – 38 × 286
Douglas Fir – Larch (includes Douglas Fir and Western Larch)	Select Structural	2.4	2.38	2.74	2.95	2.91	3.36	3.75	3.37	3.89	4.35
		3.0	2.13	2.46	2.74	2.60	3.00	3.36	2.92	3.48	3.89
		3.6	1.88	2.24	2.51	2.24	2.74	3.06	2.53	3.18	3.56
		4.2	1.66	2.08	2.32	1.99	2.49	2.84	2.25	2.81	3.29
		4.8	1.50	1.88	2.17	1.80	2.24	2.65	2.04	2.53	3.02
		5.4	1.38	1.71	2.05	1.65	2.04	2.44	1.88	2.31	2.75
		6.0	1.28	1.58	1.88	1.53	1.89	2.24	1.75	2.14	2.53
	No. 1 and No.2	2.4	1.85	2.14	2.39	2.26	2.61	2.92	2.63	3.03	3.39
		3.0	1.66	1.91	2.14	2.02	2.34	2.61	2.35	2.71	3.03
		3.6	1.51	1.74	1.95	1.85	2.13	2.39	2.14	2.48	2.77
		4.2	1.40	1.62	1.81	1.71	1.98	2.21	1.99	2.29	2.56
		4.8	1.31	1.51	1.69	1.60	1.85	2.07	1.86	2.14	2.40
		5.4	1.23	1.42	1.59	1.51	1.74	1.95	1.75	2.02	2.26
		6.0	1.17	1.35	1.51	1.43	1.65	1.85	1.66	1.92	2.14
Hem – Fir (includes Western Hemlock and Amabilis Fir)	Select Structural	2.4	2.22	2.70	2.91	2.64	3.31	3.70	2.98	3.78	4.29
		3.0	1.85	2.35	2.70	2.21	2.79	3.31	2.50	3.14	3.78
		3.6	1.61	2.02	2.43	1.92	2.40	2.89	2.18	2.71	3.24
		4.2	1.43	1.78	2.14	1.71	2.13	2.54	1.95	2.40	2.86
		4.8	1.30	1.61	1.92	1.56	1.92	2.28	1.77	2.18	2.58
		5.4	1.19	1.47	1.74	1.44	1.76	2.08	1.64	2.00	2.35
		6.0	1.11	1.36	1.61	1.34	1.63	1.92	1.53	1.85	2.18
	No. 1 and No.2	2.4	1.94	2.24	2.51	2.37	2.74	3.06	2.75	3.18	3.56
		3.0	1.74	2.00	2.24	2.12	2.45	2.74	2.46	2.84	3.18
		3.6	1.58	1.83	2.05	1.92	2.24	2.50	2.18	2.60	2.90
		4.2	1.43	1.69	1.89	1.71	2.07	2.32	1.95	2.40	2.69
		4.8	1.30	1.58	1.77	1.56	1.92	2.17	1.77	2.18	2.51
		5.4	1.19	1.47	1.67	1.44	1.76	2.04	1.64	2.00	2.35
		6.0	1.11	1.36	1.58	1.34	1.63	1.92	1.53	1.85	2.18
Spruce – Pine – Fir (includes Spruce (all species except Coast Sitka Spruce) Jack Pine, Lodgepole Pine, Balsam Fir and Alpine Fir)	Select Structural	2.4	2.35	2.58	2.78	2.89	3.30	3.55	3.24	3.89	4.33
		3.0	2.02	2.40	2.58	2.40	3.00	3.30	2.71	3.42	3.89
		3.6	1.74	2.20	2.43	2.08	2.62	3.06	2.35	2.95	3.54
		4.2	1.55	1.94	2.31	1.85	2.31	2.77	2.10	2.61	3.12
		4.8	1.40	1.74	2.09	1.68	2.08	2.48	1.91	2.35	2.80
		5.4	1.28	1.59	1.90	1.54	1.90	2.26	1.76	2.16	2.55
		6.0	1.19	1.47	1.74	1.44	1.76	2.08	1.64	2.00	2.35
	No. 1 and No.2	2.4	2.01	2.32	2.60	2.46	2.84	3.17	2.85	3.29	3.68
		3.0	1.80	2.08	2.32	2.20	2.54	2.84	2.55	2.95	3.29
		3.6	1.64	1.90	2.12	2.01	2.32	2.59	2.33	2.69	3.01
		4.2	1.52	1.75	2.96	1.85	2.15	2.40	2.10	2.49	2.78
		4.8	1.40	1.64	1.84	1.68	2.01	2.24	1.91	2.33	2.60
		5.4	1.28	1.55	1.73	1.54	1.89	2.12	1.76	2.16	2.46
		6.0	1.19	1.47	1.64	1.44	1.76	2.01	1.64	2.00	2.33
Northern Species (includes any Canadian species covered by the NLGA Standard Grading Rules)	Select Structural	2.4	1.91	2.20	2.46	2.33	2.69	3.01	2.70	3.12	3.49
		3.0	1.70	1.97	2.20	2.08	2.41	2.69	2.42	2.79	3.12
		3.6	1.56	1.80	2.01	1.90	2.20	2.46	2.18	2.55	2.85
		4.2	1.43	1.66	1.86	1.71	2.03	2.27	1.95	2.36	2.64
		4.8	1.30	1.56	1.74	1.56	1.90	2.13	1.77	2.18	2.47
		5.4	1.19	1.47	1.64	1.44	1.76	2.01	1.64	2.00	2.33
		6.0	1.11	1.36	1.56	1.34	1.63	1.90	1.53	1.85	2.18

COLUMN 1	COLUMN 2	COLUMN 3	COL. 4	COL. 5	COL. 6	COL. 7	COL. 8	COL. 9	COL. 10	COL. 11	COL. 12
Commercial Designation	Grade	Supported Length, mm(3)(4)	Maximum Span, m(5)(6)								
			Size of Built-up Beam, mm								
			3 – 38 × 184	4 – 38 × 184	5 – 38 × 184	3 – 38 × 235	4 – 38 × 235	5 – 38 × 235	3 – 38 × 286	4 – 38 × 286	5 – 38 × 286
	No. 1 and No.2	2.4	1.61	1.86	2.08	1.97	2.28	2.55	2.29	2.64	2.96
		3.0	1.44	1.67	1.86	1.76	2.04	2.28	2.05	2.36	2.64
		3.6	1.32	1.52	1.70	1.61	1.86	2.08	1.87	2.16	2.41
		4.2	1.22	1.41	1.57	1.49	1.72	1.93	1.73	2.00	2.23
		4.8	1.14	1.32	1.47	1.40	1.61	1.80	1.62	1.87	2.09
		5.4	1.08	1.24	1.39	1.32	1.52	1.70	1.53	1.76	1.97
		6.0	1.02	1.18	1.32	1.25	1.44	1.61	1.45	1.67	1.87

Notes to Table A-10:

(1) Beam spans apply only where the floors serve residential areas as described in Table 4.1.5.3., or the uniformly distributed *live load* on the floors does not exceed that specified for residential areas as described in Table 4.1.5.3.

(2) When the floors have a concrete topping of not more than 51 mm, the spans must be multiplied by 0.8

(3) Supported length means half the sum of the joists spans on both sides of the beam.

(4) Straight interpolation may be used for other supported lengths.

(5) Spans are clear spans between supports. For total span, add two bearing lengths.

(6) 3-ply beams with supported lengths greater than 4.2 m require minimum bearing length of 152 mm. All other beams require minimum bearing length of 114 mm.

Table A-11
Maximum Spans for Glue-Laminated Floor Beams – 20f-E Grade(1)

Forming Part of Sentence 9.23.4.2.(3)

COLUMN 1	COLUMN 2	COLUMN 3	COL. 4	COL. 5	COL. 6	COL. 7	COL. 8	COL. 9	COL. 10
Number of *Storeys* Supported	Beam Width, mm	Supported Length, m(2)(3)	Maximum Span, m(4)(5)(6)(7)						
			Beam Depth, mm						
			228	266	304	342	380	418	456
1	80	2.4	4.32	5.04	5.76	6.48	7.20	7.92	8.64
		3.0	3.87	4.51	5.15	5.80	6.44	7.09	7.73
		3.6	3.53	4.12	4.70	5.29	5.88	6.47	7.06
		4.2	3.27	3.81	4.36	4.90	5.44	5.99	6.53
		4.8	3.06	3.57	4.07	4.58	5.09	5.60	6.11
		5.4	2.88	3.36	3.84	4.32	4.80	5.28	5.76
		6.0	2.73	3.19	3.64	4.10	4.56	5.01	5.47
	130	2.4	5.51	6.43	7.35	8.26	9.18	10.10	11.02
		3.0	4.93	5.75	6.57	7.39	8.21	9.03	9.86
		3.6	4.50	5.25	6.00	6.75	7.50	8.25	9.00
		4.2	4.16	4.86	5.55	6.25	6.94	7.64	8.33
		4.8	3.90	4.54	5.19	5.84	6.49	7.14	7.79
		5.4	3.67	4.28	4.90	5.51	6.12	6.73	7.35
		6.0	3.48	4.07	4.65	5.23	5.81	6.39	6.97
2	80	2.4	3.28	3.83	4.37	4.92	5.47	6.01	6.56
		3.0	2.93	3.42	3.91	4.40	4.89	5.38	5.87
		3.6	2.68	3.12	3.57	4.02	4.46	4.91	5.36
		4.2	2.48	2.89	3.31	3.72	4.13	4.54	4.96
		4.8	2.32	2.71	3.09	3.48	3.86	4.25	4.64
		5.4	2.19	2.55	2.91	3.28	3.64	4.01	4.37
		6.0	2.07	2.42	2.77	3.11	3.46	3.80	4.15
	130	2.4	4.18	4.88	5.57	6.27	6.97	7.66	8.36
		3.0	3.74	4.36	4.99	5.61	6.23	6.85	7.48
		3.6	3.41	3.98	4.55	5.12	5.69	6.26	6.83
		4.2	3.16	3.69	4.21	4.74	5.27	5.79	6.32
		4.8	2.96	3.45	3.94	4.43	4.93	5.42	5.91
		5.4	2.79	3.25	3.72	4.18	4.64	5.11	5.57
		6.0	2.64	3.08	3.53	3.97	4.41	4.85	5.29

Column 1	Column 2	Column 3	Col. 4	Col. 5	Col. 6	Col. 7	Col. 8	Col. 9	Col. 10
Number of *Storeys* Supported	Beam Width, mm	Supported Length, m(2)(3)	Maximum Span, m(4)(5)(6)(7)						
			Beam Depth, mm						
			228	266	304	342	380	418	456
3	80	2.4	2.75	3.21	3.66	4.12	4.58	5.04	5.50
		3.0	2.46	2.87	3.28	3.69	4.10	4.51	4.92
		3.6	2.24	2.62	2.99	3.37	3.74	4.11	4.49
		4.2	2.08	2.42	2.77	3.12	3.46	3.81	4.15
		4.8	1.94	2.27	2.59	2.91	3.24	3.56	3.89
		5.4	1.83	2.14	2.44	2.75	3.05	3.36	3.66
		6.0	1.74	2.03	2.32	2.61	2.90	3.19	3.48
	130	2.4	3.50	4.09	4.67	5.25	5.84	6.42	7.01
		3.0	3.13	3.66	4.18	4.70	5.22	5.74	6.27
		3.6	2.86	3.34	3.81	4.29	4.77	5.24	5.72
		4.2	2.65	3.09	3.53	3.97	4.41	4.85	5.30
		4.8	2.48	2.89	3.30	3.72	4.13	4.54	4.95
		5.4	2.34	2.72	3.11	3.50	3.89	4.28	4.67
		6.0	2.22	2.58	2.95	3.32	3.69	4.06	4.43

Notes to Table A-11:

(1) Spans apply only where the floors serve residential areas as described in Table 4.1.5.3., or the uniformly distributed *live load* on the floor does not exceed that specified for residential areas as described in Table 4.1.5.3.

(2) Supported length means half the sum of the joist spans on both sides of the beam.

(3) Straight interpolation may be used for other supported lengths.

(4) Spans are valid for glued-laminated timber conforming to CAN/CSA-O122-M and CAN/CSA-O177-M.

(5) Spans are clear spans between supports. For total span, add two bearing lengths.

(6) Provide a minimum bearing length of 89 mm. (Alternatively, the bearing length may be designed in accordance with Part 4.)

(7) Top edge of beam assumed to be fully laterally supported by joists.

Table A-12
Maximum Spans for Built-up Ridge Beams and Lintels Supporting the Roof and Ceiling Only – No. 1 or No. 2 Grade

Forming Part of Sentence 9.23.4.2.(4)

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
Commercial Designation	Beam or Lintel Size, mm	Maximum Span, m(1)(2)(3)				
		Specified Snow Load, kPa				
		1.0	1.5	2.0	2.5	3.0
Douglas Fir – Larch (includes Douglas Fir and Western Larch)	3 – 38 × 184	2.65	2.28	2.03	1.85	1.71
	4 – 38 × 184	3.06	2.64	2.35	2.14	1.97
	5 – 38 × 184	3.43	2.95	2.62	2.39	2.21
	3 – 38 × 235	3.25	2.79	2.49	2.26	2.09
	4 – 38 × 235	3.75	3.22	2.87	2.61	2.41
	5 – 38 × 235	4.19	3.60	3.21	2.92	2.70
	3 – 38 × 286	3.77	3.24	2.88	2.62	2.43
	4 – 38 × 286	4.35	3.74	3.33	3.03	2.80
	5 – 38 × 286	4.86	4.18	3.72	3.39	3.13
Hem – Fir (includes Western Hemlock and Amabilis Fir)	3 – 38 × 184	2.78	2.39	2.13	1.94	1.79
	4 – 38 × 184	3.21	2.76	2.46	2.24	2.07
	5 – 38 × 184	3.59	3.09	2.75	2.50	2.31
	3 – 38 × 235	3.40	2.93	2.61	2.37	2.19
	4 – 38 × 235	3.93	3.38	3.01	2.74	2.53
	5 – 38 × 235	4.39	3.78	3.36	3.06	2.83
	3 – 38 × 286	3.95	3.40	3.02	2.75	2.54
	4 – 38 × 286	4.56	3.92	3.49	3.18	2.94
	5 – 38 × 286	5.10	4.38	3.90	3.55	3.28

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7
Commercial Designation	Beam or Lintel Size, mm	Maximum Span, m(1)(2)(3)				
		Specified Snow Load, kPa				
		1.0	1.5	2.0	2.5	3.0
Spruce – Pine – Fir (includes Spruce (all species except Coast Sitka Spruce) Jack Pine, Lodgepole Pine, Balsam Fir and Alpine Fir)	3 – 38 × 184	2.88	2.48	2.21	2.01	1.86
	4 – 38 × 184	3.30	2.86	2.55	2.32	2.14
	5 – 38 × 184	3.55	3.10	2.82	2.59	2.40
	3 – 38 × 235	3.53	3.03	2.70	2.46	2.27
	4 – 38 × 235	4.07	3.50	3.12	2.84	2.62
	5 – 38 × 235	4.54	3.91	3.49	3.17	2.93
	3 – 38 × 286	4.09	3.52	3.13	2.85	2.63
	4 – 38 × 286	4.72	4.06	3.62	3.29	3.04
	5 – 38 × 286	5.28	4.54	4.04	3.68	3.40

Notes to Table A-12:

(1) Beam and lintel spans are calculated based on a maximum supported length of 4.9 m. Spans may be increased by 5% for supported lengths of not more than 4.3 m, by 10% for supported lengths of not more than 3.7 m, and by 25% for supported lengths of not more than 2.4 m.

(2) For ridge beams, supported length means half the sum of the rafter, joist or truss spans on both sides of the beam. For lintels, supported length means half the sum of truss, roof joist or rafter spans supported by the lintel plus the length of the overhang beyond the lintel.

(3) Provide a minimum bearing length of 76 mm.

Table A-13
Maximum Spans for Douglas Fir – Larch Lintels – No. 1 or No. 2 Grade -Non-Structural Sheathing(1)

Forming Part of Sentences 9.23.12.3.(1) and (3)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8
Lintel Supporting	Lintel Size, mm(2)	Maximum Span, m(3)(4)					
		Exterior Walls					Interior Walls
		Specified Snow Load, kPa					
		1.0	1.5	2.0	2.5	3.0	
Limited attic storage and ceiling	2 – 38 × 89	This Area Intentionally Left Blank					1.25
	2 – 38 × 140						1.78
	2 – 38 × 184						2.17
	2 – 38 × 235						2.65
	2 – 38 × 286						3.08
Roof and ceiling only (tributary width of 0.6 m maximum)(5)	2 – 38 × 89	2.68	2.34	2.13	1.97	1.86	1.97
	2 – 38 × 140	4.21	3.68	3.34	3.10	2.92	3.10
	2 – 38 × 184	5.50	4.84	4.39	4.08	3.84	4.08
	2 – 38 × 235	6.61	5.97	5.56	5.21	4.88	5.21
	2 – 38 × 286	7.66	6.92	6.44	6.09	5.66	6.09
Roof and ceiling only (tributary width of 4.9 m maximum)(6)	2 – 38 × 89	1.25	1.07	0.96	0.87	0.80	0.87
	2 – 38 × 140	1.78	1.53	1.36	1.24	1.15	1.24
	2 – 38 × 184	2.17	1.86	1.66	1.51	1.40	1.51
	2 – 38 × 235	2.65	2.28	2.03	1.85	1.71	1.85
	2 – 38 × 286	3.08	2.64	2.35	2.14	1.98	2.14
Roof, ceiling and 1 storey(3)(6)(7)	2 – 38 × 89	0.96	0.88	0.82	0.77	0.73	0.68
	2 – 38 × 140	1.37	1.26	1.17	1.10	1.04	0.97
	2 – 38 × 184	1.67	1.53	1.42	1.34	1.26	1.18
	2 – 38 × 235	2.04	1.88	1.74	1.63	1.54	1.44
	2 – 38 × 286	2.37	2.18	2.02	1.90	1.79	1.67
Roof, ceiling and 2 storeys(3)(6)(7)	2 – 38 × 89	0.86	0.81	0.77	0.73	0.70	0.61
	2 – 38 × 140	1.23	1.16	1.09	1.04	0.99	0.87
	2 – 38 × 184	1.50	1.41	1.33	1.27	1.21	1.06
	2 – 38 × 235	1.84	1.72	1.63	1.55	1.48	1.30
	2 – 38 × 286	2.13	2.00	1.89	1.80	1.72	1.51
Roof, ceiling and 3 storeys(3)(6)(7)	2 – 38 × 89	0.81	0.77	0.73	0.71	0.68	0.57
	2 – 38 × 140	1.15	1.10	1.05	1.01	0.97	0.82
	2 – 38 × 184	1.40	1.33	1.28	1.22	1.18	1.00
	2 – 38 × 235	1.71	1.63	1.56	1.50	1.44	1.22
	2 – 38 × 286	1.99	1.89	1.81	1.74	1.67	1.41

Notes to Table A-13:

(1) Where structural sheathing is used, lintel spans may be increased by 15%. Structural sheathing consists of a minimum 9.5 mm thick structural panel conforming to CSA O121-M, CSA O151, CAN/CSA-O325.0 or CSA O437.0 fastened with at least two rows of fasteners to the exterior face of the lintel, and a single row to the top plates and studs. Fasteners shall conform to Table 9.23.3.5.

(2) A single piece of 89 mm thick lumber may be used in lieu of 2 pieces of 38 mm thick lumber on edge.

(3) If floor joists span the full width of the *building* without support, lintel spans shall be reduced by 15% for "Roof, ceiling and 1 *storey*", by 20% for "Roof, ceiling and 2 *storeys*", and by 25% for "Roof, ceiling and 3 *storeys*".

(4) For ends of lintels fully supported by walls, provide minimum bearing length of 38 mm for lintel spans up to 3 m, or minimum bearing length of 76 mm for lintel spans greater than 3 m.

(5) Spans for 0.6 m tributary width are calculated for lintels in end walls that support only a 0.6 m width of roof and ceiling, but do not support roof joists, roof rafters or roof trusses.

(6) Lintel spans are calculated based on a maximum floor joist, roof joist or rafter span of 4.9 m and a maximum roof truss span of 9.8 m. Lintel spans may be increased by 5% if rafter and joist spans are not more than 4.3 m and roof truss spans are not more than 8.6 m. Spans may be increased by 10% if rafter and joist spans are not more than 3.7 m and roof trusses are not more than 7.4 m.

(7) Spans apply only where the floors serve residential areas as described in Table 4.1.5.3., or the uniformly distributed *live load* does not exceed that specified for residential areas as described in Table 4.1.5.3.

Table A-14
Maximum Spans for Hem – Fir Lintels – No. 1 or No. 2 Grade – Non-Structural Sheathing(1)

Forming Part of Sentences 9.23.12.3.(1) and (3)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8
Lintel Supporting	Lintel Size, mm(2)	Maximum Span, m(3)(4)					
		Exterior Walls					Interior Walls
		Specified Snow Load, kPa					
		1.0	1.5	2.0	2.5	3.0	
Limited attic storage and ceiling	2 – 38 × 89	This Area Intentionally Left Blank					1.31
	2 – 38 × 140						1.87
	2 – 38 × 184						2.27
	2 – 38 × 235						2.78
	2 – 38 × 286						3.23
Roof and ceiling only (tributary width of 0.6 m maximum)(5)	2 – 38 × 89	2.68	2.34	2.13	1.97	1.86	1.97
	2 – 38 × 140	4.21	3.68	3.34	3.10	2.92	3.10
	2 – 38 × 184	5.50	4.84	4.39	4.08	3.84	4.08
	2 – 38 × 235	6.61	5.97	5.56	5.21	4.90	5.21
	2 – 38 × 286	7.66	6.92	6.44	6.09	5.82	6.09
Roof and ceiling only (tributary width of 4.9 m maximum)(6)	2 – 38 × 89	1.31	1.13	1.00	0.91	0.84	0.91
	2 – 38 × 140	1.87	1.61	1.43	1.30	1.20	1.30
	2 – 38 × 184	2.27	1.95	1.74	1.58	1.42	1.58
	2 – 38 × 235	2.78	2.39	2.13	1.92	1.71	1.92
	2 – 38 × 286	3.23	2.77	2.47	2.17	1.94	2.17
Roof, ceiling and 1 *storey*(3)(6)(7)	2 – 38 × 89	1.01	0.93	0.86	0.81	0.76	0.69
	2 – 38 × 140	1.44	1.32	1.23	1.14	1.05	0.95
	2 – 38 × 184	1.75	1.61	1.47	1.34	1.23	1.12
	2 – 38 × 235	2.14	1.96	1.76	1.60	1.48	1.35
	2 – 38 × 286	2.49	2.22	2.00	1.82	1.69	1.55
Roof, ceiling and 2 *storeys*(3)(6)(7)	2 – 38 × 89	0.91	0.85	0.80	0.76	0.72	0.60
	2 – 38 × 140	1.29	1.21	1.13	1.05	0.98	0.82
	2 – 38 × 184	1.57	1.44	1.33	1.24	1.16	0.98
	2 – 38 × 235	1.90	1.73	1.60	1.49	1.40	1.19
	2 – 38 × 286	2.15	1.97	1.82	1.70	1.60	1.37
Roof, ceiling and 3 *storeys*(3)(6)(7)	2 – 38 × 89	0.85	0.81	0.77	0.74	0.69	0.55
	2 – 38 × 140	1.21	1.14	1.06	1.00	0.95	0.76
	2 – 38 × 184	1.43	1.33	1.25	1.18	1.12	0.91
	2 – 38 × 235	1.72	1.60	1.50	1.42	1.35	1.10
	2 – 38 × 286	1.95	1.82	1.72	1.63	1.55	1.27

Notes to Table A-14:

(1) Where structural sheathing is used, lintel spans may be increased by 15%. Structural sheathing consists of a minimum 9.5 mm thick structural panel conforming to CSA O121-M, CSA O151, CAN/CSA-O325.0 or CSA O437.0 fastened with at least two rows of fasteners to the exterior face of the lintel, and a single row to the top plates and studs. Fasteners shall conform to Table 9.23.3.5.

(2) A single piece of 89 mm thick lumber may be used in lieu of 2 pieces of 38 mm thick lumber on edge.

(3) If floor joists span the full width of the *building* without support, lintel spans shall be reduced by 15% for "Roof, ceiling and 1 *storey*", by 20% for "Roof, ceiling and 2 *storeys*", and by 25% for "Roof, ceiling and 3 *storeys*".

(4) For ends of lintels fully supported by walls, provide minimum bearing length of 38 mm for lintel spans up to 3 m, or minimum bearing length of 76 mm for lintel spans greater than 3 m.

(5) Spans for 0.6 m tributary width are calculated for lintels in end walls that support only a 0.6 m width of roof and ceiling, but do not support roof joists, roof rafters or roof trusses.

(6) Lintel spans are calculated based on a maximum floor joist, roof joist or rafter span of 4.9 m and a maximum roof truss span of 9.8 m. Lintel spans may be increased by 5% if rafter and joist spans are not more than 4.3 m and roof truss spans are not more than 8.6 m. Spans may be increased by 10% if rafter and joist spans are not more than 3.7 m and roof trusses are not more than 7.4 m.

(7) Spans apply only where the floors serve residential areas as described in Table 4.1.5.3., or the uniformly distributed *live load* does not exceed that specified for residential areas as described in Table 4.1.5.3.

Table A-15
Maximum Spans for Spruce – Pine – Fir Lintels – No. 1 or No. 2 Grade – Non-Structural Sheathing(1)

Forming Part of Sentences 9.23.12.3.(1) and (3)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8
Lintel Supporting	Lintel Size, mm(2)	Maximum Span, m(3)(4)					
		Exterior Walls					Interior Walls
		Specified Snow Load, kPa					
		1.0	1.5	2.0	2.5	3.0	
Limited attic storage and ceiling	2 – 38 × 89	This Area Intentionally Left Blank					1.27
	2 – 38 × 140						1.93
	2 – 38 × 184						2.35
	2 – 38 × 235						2.88
	2 – 38 × 286						3.34
Roof and ceiling only (tributary width of 0.6 m maximum)(5)	2 – 38 × 89	2.55	2.23	2.02	1.88	1.77	1.88
	2 – 38 × 140	4.01	3.50	3.18	2.96	2.78	2.96
	2 – 38 × 184	5.27	4.61	4.18	3.88	3.66	3.88
	2 – 38 × 235	6.37	5.76	5.34	4.96	4.67	4.96
	2 – 38 × 286	7.38	6.67	6.21	5.87	5.61	5.87
Roof and ceiling only (tributary width of 4.9 m maximum)(6)	2 – 38 × 89	1.27	1.11	1.01	0.93	0.87	0.93
	2 – 38 × 140	1.93	1.66	1.48	1.35	1.25	1.35
	2 – 38 × 184	2.35	2.02	1.80	1.64	1.52	1.64
	2 – 38 × 235	2.88	2.47	2.20	2.01	1.84	2.01
	2 – 38 × 286	3.34	2.87	2.56	2.33	2.09	2.33
Roof, ceiling and 1 *storey*(3)(6)(7)	2 – 38 × 89	1.05	0.96	0.89	0.84	0.79	0.74
	2 – 38 × 140	1.49	1.37	1.27	1.19	1.13	1.02
	2 – 38 × 184	1.82	1.67	1.55	1.44	1.33	1.20
	2 – 38 × 235	2.22	2.04	1.89	1.73	1.59	1.45
	2 – 38 × 286	2.58	2.36	2.15	1.96	1.81	1.66
Roof, ceiling and 2 *storeys*(3)(6)(7)	2 – 38 × 89	0.94	0.88	0.83	0.79	0.76	0.64
	2 – 38 × 140	1.34	1.26	1.19	1.13	1.06	0.88
	2 – 38 × 184	1.63	1.53	1.44	1.33	1.25	1.05
	2 – 38 × 235	1.99	1.87	1.72	1.60	1.50	1.27
	2 – 38 × 286	2.31	2.12	1.96	1.82	1.71	1.45
Roof, ceiling and 3 *storeys*(3)(6)(7)	2 – 38 × 89	0.88	0.83	0.80	0.77	0.74	0.59
	2 – 38 × 140	1.25	1.19	1.14	1.08	1.02	0.81
	2 – 38 × 184	1.52	1.44	1.35	1.27	1.21	0.97
	2 – 38 × 235	1.86	1.73	1.62	1.53	1.45	1.17
	2 – 38 × 286	2.11	1.96	1.84	1.74	1.66	1.35

Notes to Table A-15:

(1) Where structural sheathing is used, lintel spans may be increased by 15%. Structural sheathing consists of a minimum 9.5 mm thick structural panel conforming to CSA O121-M, CSA O151, CAN/CSA-O325.0 or CSA O437.0 fastened with at least two rows of fasteners to the exterior face of the lintel, and a single row to the top plates and studs. Fasteners shall conform to Table 9.23.3.5.

(2) A single piece of 89 mm thick lumber may be used in lieu of 2 pieces of 38 mm thick lumber on edge.

(3) If floor joists span the full width of the *building* without support, lintel spans shall be reduced by 15% for "Roof, ceiling and 1 *storey*", by 20% for "Roof, ceiling and 2 *storeys*", and by 25% for "Roof, ceiling and 3 *storeys*".

(4) For ends of lintels fully supported by walls, provide minimum bearing length of 38 mm for lintel spans up to 3 m, or minimum bearing length of 76 mm for lintel spans greater than 3 m.

(5) Spans for 0.6 m tributary width are calculated for lintels in end walls that support only a 0.6 m width of roof and ceiling, but do not support roof joists, roof rafters or roof trusses.

(6) Lintel spans are calculated based on a maximum floor joist, roof joist or rafter span of 4.9 m and a maximum roof truss span of 9.8 m. Lintel spans may be increased by 5% if rafter and joist spans are not more than 4.3 m and roof truss spans are not more than 8.6 m. Spans may be increased by 10% if rafter and joist spans are not more than 3.7 m and roof trusses are not more than 7.4 m.

(7) Spans apply only where the floors serve residential areas as described in Table 4.1.5.3., or the uniformly distributed *live load* does not exceed that specified for residential areas as described in Table 4.1.5.3.

Table A-16
Maximum Spans for Glued-Laminated Timber Lintels – 20f-E Stress Grade – Exterior Walls – Roof and Ceiling Load Only

Forming Part of Sentences 9.23.12.3.(1) and (3)

COL. 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Lintel Size, mm	Maximum Span, m(1)(2)(3)														
	Specified Snow Load, kPa														
	1.0			1.5			2.0			2.5			3.0		
	Supported length, m(4)(5)			Supported length, m(4)(5)			Supported length, m(4)(5)			Supported length, m(4)(5)			Supported length, m(4)(5)		
	2.4	3.6	4.8	2.4	3.6	4.8	2.4	3.6	4.8	2.4	3.6	4.8	2.4	3.6	4.8
130 × 304	6.23	5.63	5.24	5.63	5.09	4.73	5.24	4.73	4.40	4.95	4.48	4.17	4.73	4.28	3.87
80 × 380	6.52	5.89	5.48	5.89	5.32	4.96	5.48	4.96	4.52	5.19	4.69	4.11	4.96	4.39	3.80
130 × 342	6.80	6.15	5.72	6.15	5.56	5.17	5.72	5.17	4.81	5.41	4.89	4.55	5.17	4.67	4.35
80 × 418	7.00	6.33	5.89	6.33	5.72	5.32	5.89	5.32	4.96	5.57	5.03	4.52	5.32	4.81	4.18
130 × 380	7.36	6.65	6.19	6.65	6.01	5.59	6.19	5.59	5.21	5.86	5.29	4.92	5.59	5.06	4.70
80 × 456	7.48	6.76	6.29	6.76	6.10	5.68	6.29	5.68	5.29	5.95	5.37	4.93	5.68	5.13	4.56
130 × 418	7.91	7.15	6.65	7.15	6.46	6.01	6.65	6.01	5.59	6.29	5.68	5.29	6.01	5.43	5.05
80 × 494	7.94	7.17	6.68	7.17	6.48	6.03	6.68	6.03	5.61	6.31	5.71	5.31	6.03	5.45	4.94
80 × 532	8.39	7.58	7.06	7.58	6.85	6.38	7.06	6.38	5.93	6.67	6.03	5.61	6.38	5.76	5.32
130 × 456	8.44	7.63	7.10	7.63	6.89	6.41	7.10	6.41	5.97	6.71	6.07	5.65	6.41	5.80	5.39

Notes to Table A-16:

(1) Spans are valid for glued-laminated timber conforming to CAN/CSA-O122-M and CAN/CSA-O177-M.

(2) Provide a minimum bearing length of 89 mm. (Alternatively, the bearing length may be calculated in accordance with Part 4.)

(3) Top edge of lintel assumed to be fully laterally supported.

(4) Supported length means half the length of trusses or rafters, plus the length of overhang beyond the wall.

(5) For intermediate supported lengths, straight interpolation may be used.

Table A-17
Maximum Allowable Clear Spans for Lintels in Flat Loadbearing Insulating Concrete Form (ICF) Walls(1)(2)(3)
(1-10M Bottom Bar)

Forming Part of Sentence 9.20.17.4.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6
Minimum Lintel Thickness, mm	Minimum Lintel Depth, mm	Maximum Clear Span, m			
		Supporting Light-Frame Roof Only		Supporting ICF Second *Storey* and Light-Frame Roof	
		Maximum Ground Snow Load, kN/m^2			
		1.50	3.33	1.50	3.33
140	200	1.41	1.18	1.03	0.93
	300	1.78	1.50	1.30	1.18
	400	2.08	1.75	1.53	1.38
	500	2.33	1.97	1.72	1.56
	600	2.55	2.16	1.89	1.71
150	200	1.41	1.18	1.02	0.92
	300	1.78	1.50	1.29	1.17
	400	2.08	1.75	1.51	1.37
	500	2.33	1.97	1.70	1.54
	600	2.54	2.15	1.87	1.70
160	200	1.41	1.18	1.01	0.91
	300	1.78	1.50	1.28	1.16
	400	2.07	1.75	1.50	1.36
	500	2.32	1.96	1.68	1.53
	600	2.53	2.15	1.85	1.68
190	200	1.41	1.19	0.98	0.89
	300	1.78	1.50	1.24	1.13
	400	2.06	1.74	1.45	1.32
	500	2.30	1.95	1.63	1.49
	600	2.51	2.13	1.78	1.63
200	200	1.41	1.19	0.97	0.89
	300	1.77	1.49	1.23	1.12
	400	2.06	1.74	1.43	1.31
	500	2.30	1.95	1.61	1.48
	600	2.50	2.13	1.77	1.62
240	200	1.41	1.19	0.94	0.86
	300	1.76	1.49	1.18	1.09
	400	2.04	1.73	1.38	1.27
	500	2.27	1.93	1.55	1.43
	600	2.47	2.11	1.70	1.56

Notes to Table A-17:

(1) Deflection criteria is L/240, where "L" is the clear span of the lintel.

(2) Linear interpolation is permitted between ground snow loads and between lintel depths.

(3) 10M stirrups are required at a maximum d/2 spacing for spans greater than 1 200 mm, where "d" is the distance from the top of the lintel to the level of the bottom reinforcing bar in the lintel.

Table A-18
Maximum Allowable Clear Spans for Lintels in Flat Loadbearing Insulating Concrete Form (ICF) Walls(1)(2)(3)
(1-15M Bottom Bar)

Forming Part of Sentence 9.20.17.4.(2)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6
Minimum Lintel Thickness, mm	Minimum Lintel Depth, mm	Maximum Clear Span, m			
		Supporting Light-Frame Roof Only		Supporting ICF Second *Storey* and Light-Frame Roof	
		Maximum Ground Snow Load, kN/m^2			
		1.50	3.33	1.50	3.33
140	200	1.63	1.46	1.31	1.23
	300	2.43	2.08	1.81	1.64
	400	2.90	2.44	2.13	1.93
	500	3.26	2.75	2.41	2.18
	600	3.58	3.03	2.65	2.40

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6
Minimum Lintel Thickness, mm	Minimum Lintel Depth, mm	Maximum Clear Span, m			
		Supporting Light-Frame Roof Only		Supporting ICF Second *Storey* and Light-Frame Roof	
		Maximum Ground Snow Load, kN/m^2			
		1.50	3.33	1.50	3.33
150	200	1.67	1.49	1.33	1.25
	300	2.48	2.08	1.79	1.62
	400	2.90	2.44	2.11	1.91
	500	3.26	2.75	2.38	2.16
	600	3.57	3.02	2.62	2.38
160	200	1.70	1.53	1.35	1.26
	300	2.48	2.08	1.78	1.61
	400	2.90	2.44	2.09	1.90
	500	3.25	2.75	2.36	2.14
	600	3.56	3.02	2.59	2.36
190	200	1.80	1.61	1.36	1.24
	300	2.48	2.09	1.73	1.58
	400	2.89	2.44	2.03	1.85
	500	3.23	2.74	2.29	2.09
	600	3.53	3.00	2.51	2.30
200	200	1.83	1.64	1.35	1.23
	300	2.48	2.09	1.71	1.57
	400	2.88	2.44	2.01	1.84
	500	3.22	2.74	2.26	2.07
	600	3.52	2.99	2.48	2.28
240	200	1.93	1.65	1.30	1.20
	300	2.47	2.08	1.66	1.52
	400	2.86	2.43	2.94	1.78
	500	3.19	2.72	2.18	2.01
	600	3.47	2.97	2.39	2.20

Notes to Table A-18:

(1) Deflection criteria is L/240, where "L" is the clear span of the lintel.

(2) Linear interpolation is permitted between ground snow loads and between lintel depths.

(3) 10M stirrups are required at a maximum d/2 spacing for spans greater than 1 200 mm, where "d" is the distance from the top of the lintel to the level of the bottom reinforcing bar in the lintel.

Table A-19
Maximum Allowable Clear Spans for Lintels in Flat Loadbearing Insulating Concrete Form (ICF) Walls(1)(2)(3)
(2-15M Bottom Bar)

Forming Part of Sentence 9.20.17.4.(2)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6
Minimum Lintel Thickness, mm	Minimum Lintel Depth, mm	Maximum Clear Span, m			
		Supporting Light-Frame Roof Only		Supporting ICF Second *Storey* and Light-Frame Roof	
		Maximum Ground Snow Load, kN/m^2			
		1.50	3.33	1.50	3.33
140	200	1.63	1.46	1.31	1.23
	300	2.43	2.18	1.96	1.84
	400	3.22	2.90	2.60	2.42
	500	4.00	3.60	3.25	2.70
	600	4.71	4.20	3.61	2.97
150	200	1.67	1.49	1.33	1.25
	300	2.48	2.23	1.99	1.87
	400	3.29	2.96	2.64	2.45
	500	4.80	3.68	3.29	2.74
	600	4.87	4.20	3.64	3.02
160	200	1.70	1.53	1.35	1.27
	300	2.53	2.28	2.02	1.90
	400	3.36	3.02	2.68	2.48
	500	4.16	3.76	3.27	2.78
	600	4.95	4.20	3.61	3.08

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6
Minimum Lintel Thickness, mm	Minimum Lintel Depth, mm	Maximum Clear Span, m			
		Supporting Light-Frame Roof Only		Supporting ICF Second *Storey* and Light-Frame Roof	
		Maximum Ground Snow Load, kN/m^2			
		1.50	3.33	1.50	3.33
190	200	1.80	1.61	1.39	1.32
	300	2.67	2.40	2.09	1.97
	400	3.53	3.19	2.77	2.56
	500	4.38	3.81	3.18	2.90
	600	4.92	4.19	3.50	3.21
200	200	1.83	1.64	1.41	1.33
	300	2.87	2.44	2.11	2.00
	400	3.78	3.24	2.79	2.55
	500	4.46	3.81	3.15	2.89
	600	4.86	4.18	3.47	3.18
240	200	2.07	1.74	1.46	1.38
	300	3.07	2.59	2.18	2.07
	400	3.95	3.38	2.70	2.48
	500	4.40	3.80	3.04	2.80
	600	4.78	4.16	3.34	3.08

Notes to Table A-19:

(1) Deflection criteria is L/240, where "L" is the clear span of the lintel.

(2) Linear interpolation is permitted between ground snow loads and between lintel depths.

(3) 10M stirrups are required at a maximum d/2 spacing for spans greater than 1 200 mm, where "d" is the distance from the top of the lintel to the level of the bottom reinforcing bar in the lintel.

Table A-20
Maximum Spans for Steel Beams Supporting a Roof and one Floor in Dwelling Units Where Beams Support Exterior Stud Walls with Brick Veneer – 1.0 kPa Specified Roof Design Snow Load

Forming Part of Sentence 9.23.4.3.(1)

COLUMN 1		COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9
Maximum Span, m									
Roof *Live Load*, kPa		1.0							
Supported Roof Length, m		2.4		3.6		4.8		6.0	
Supported Floor Length, m		2.4	3.6	2.4	3.6	2.4	3.6	2.4	3.6
Steel Beam Section	W 150 × 22	2.96	2.79	2.86	2.71	2.78	2.65	2.71	2.59
	W 150 × 30	3.32	3.14	3.22	3.05	3.13	2.98	3.04	2.91
	W 150 × 37	3.62	3.41	3.50	3.32	3.40	3.24	3.32	3.17
	W 200 × 27	3.80	3.59	3.68	3.49	3.58	3.41	3.49	3.33
	W 200 × 31	4.06	3.83	3.93	3.73	3.82	3.64	3.72	3.56
	W 200 × 36	4.17	3.94	4.04	3.83	3.93	3.74	3.82	3.65
	W 200 × 42	4.42	4.18	4.29	4.06	4.16	3.96	4.05	3.87
	W 250 × 33	4.71	4.44	4.56	4.32	4.43	4.22	4.31	4.12
	W 250 × 39	5.04	4.76	4.88	4.63	4.75	4.52	4.62	4.41
	W 250 × 49	5.32	5.02	5.15	4.89	5.01	4.77	4.87	4.66
	W 310 × 39	5.66	5.34	5.49	5.20	5.33	5.07	5.19	4.96
	W 310 × 45	5.96	5.62	5.77	5.47	5.61	5.34	5.46	5.22
	W 310 × 52	6.33	5.98	6.13	5.82	5.96	5.67	5.8	5.54
	W 310 × 60	6.50	6.14	6.30	5.98	6.12	5.83	5.96	5.69
	W 360 × 33	5.61	5.29	5.43	5.15	5.28	5.03	5.14	4.91
	W 360 × 39	6.01	5.68	5.83	5.53	5.66	5.39	5.51	5.27
	W 360 × 45	6.38	6.03	6.19	5.87	6.01	5.72	5.85	5.59
	W 360 × 51	6.70	6.32	6.49	6.16	6.31	6.00	6.14	5.87
	W 360 × 57	7.00	6.61	6.78	6.43	6.59	6.28	6.42	6.13

Table A-21
Maximum Spans for Steel Beams Supporting a Roof and one Floor in Dwelling Units Where Beams Support Interior Stud Walls or Exterior Stud Walls with Siding – 1.0 kPa Specified Roof Design Snow Load

Forming Part of Sentence 9.23.4.3 (1)

COLUMN 1		COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9
Maximum Span, m									
Roof *Live Load*, kPa		1.0							
Supported Roof Length, m		2.4		3.6		4.8		6.0	
Supported Floor Length, m		2.4	3.6	2.4	3.6	2.4	3.6	2.4	3.6
Steel Beam Section	W 150 × 22	4.20	3.82	3.98	3.67	3.81	3.51	3.66	3.35
	W 150 × 30	4.72	4.30	4.48	4.13	4.28	3.98	4.11	3.85
	W 150 × 37	5.14	4.68	4.88	4.49	4.66	4.33	4.48	4.19
	W 200 × 27	5.41	4.92	5.13	4.72	4.90	4.56	4.71	4.41
	W 200 × 31	5.77	5.25	5.48	5.04	5.23	4.86	5.02	4.71
	W 200 × 36	5.93	5.40	5.63	5.18	5.38	5.00	5.16	4.84
	W 200 × 42	6.29	5.72	5.97	5.50	5.70	5.30	5.47	5.13
	W 250 × 33	6.69	6.09	6.35	5.85	6.06	5.64	5.82	5.45
	W 250 × 39	7.17	6.52	6.80	6.26	6.49	6.04	6.24	5.85
	W 250 × 49	7.56	6.88	7.17	6.61	6.85	6.37	6.58	6.17
	W 310 × 39	8.05	7.32	7.63	7.03	7.29	6.78	7.01	6.56
	W 310 × 45	8.47	7.71	8.03	7.40	7.68	7.14	7.37	6.91

Table A-22
Maximum Spans for Steel Beams Supporting a Roof and one Floor in Dwelling Units Where Beams Support Exterior Stud Walls with Brick Veneer – 1.5 kPa Specified Roof Design Snow Load

Forming Part of Sentence 9.23.4.3(1)

COLUMN 1		COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9
Maximum Span, m									
Roof *Live Load*, kPa		1.5							
Supported Roof Length, m		2.4		3.6		4.8		6.0	
Supported Floor Length, m		2.4	3.6	2.4	3.6	2.4	3.6	2.4	3.6
Steel Beam Section	W 150 × 22	2.86	2.71	2.74	2.62	2.64	2.53	2.55	2.46
	W 150 × 30	3.22	3.05	3.08	2.94	2.97	2.85	2.87	2.76
	W 150 × 37	3.50	3.32	3.36	3.20	3.23	3.10	3.13	3.01
	W 200 × 27	3.68	3.49	3.53	3.37	3.40	3.26	3.29	3.16
	W 200 × 31	3.93	3.73	3.77	3.60	3.63	3.48	3.51	3.38
	W 200 × 36	4.04	3.83	3.88	3.70	3.73	3.58	3.61	3.47
	W 200 × 42	4.29	4.06	4.11	3.92	3.96	3.79	3.82	3.68
	W 250 × 33	4.56	4.32	4.37	4.17	4.21	4.03	4.07	3.91
	W 250 × 39	4.88	4.63	4.68	4.47	4.51	4.32	4.36	4.19
	W 250 × 49	5.15	4.89	4.94	4.71	4.76	4.56	4.60	4.42
	W 310 × 39	5.49	5.20	5.26	5.01	5.06	4.85	4.89	4.71
	W 310 × 45	5.77	5.47	5.53	5.28	5.33	5.11	5.15	4.95
	W 310 × 52	6.13	5.82	5.88	5.61	5.66	5.43	5.47	5.26
	W 310 × 60	6.30	5.98	6.04	5.76	5.81	5.57	5.62	5.41
	W 360 × 33	5.43	5.15	5.21	4.97	5.01	4.81	4.85	4.66
	W 360 × 39	5.83	5.53	5.58	5.33	5.38	5.15	5.20	5.00
	W 360 × 45	6.19	5.87	5.93	5.65	5.71	5.47	5.52	5.31
	W 360 × 51	6.49	6.16	6.22	5.93	5.99	5.74	5.79	5.57
	W 360 × 57	6.78	6.43	6.50	6.20	6.26	6.00	6.05	5.82

Table A-23
Maximum Spans for Steel Beams Supporting a Roof and one Floor in Dwelling Units Where Beams Support Interior Stud Walls or Exterior Stud Walls with Siding – 1.5 kPa Specified Roof Design Snow Load

Forming Part of Sentence 9.23.4.3(1)

COLUMN 1		COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9
Maximum Span, m									
Roof *Live Load*, kPa		1.5							
Supported Roof Length, m		2.4		3.6		4.8		6.0	
Supported Floor Length, m		2.4	3.6	2.4	3.6	2.4	3.6	2.4	3.6
Steel Beam Section	W 150 × 22	3.98	3.67	3.73	3.48	3.53	3.30	3.36	3.12
	W 150 × 30	4.48	4.13	4.19	3.91	3.97	3.74	3.78	3.59
	W 150 × 37	4.88	4.49	4.56	4.26	4.32	4.07	4.12	3.91
	W 200 × 27	5.13	4.72	4.80	4.48	4.54	4.28	4.33	4.11
	W 200 × 31	5.48	5.04	5.12	4.78	4.85	4.57	4.62	4.39
	W 200 × 36	5.63	5.18	5.27	4.92	4.98	4.70	4.75	4.51
	W 200 × 42	5.97	5.50	5.58	5.21	5.28	4.98	5.04	4.78
	W 250 × 33	6.35	5.85	5.94	5.54	5.62	5.30	5.36	5.09
	W 250 × 39	6.80	6.26	6.36	5.94	6.02	5.67	5.74	5.45
	W 250 × 49	7.17	6.61	6.71	6.27	6.35	5.99	6.06	5.75
	W 310 × 39	7.63	7.03	7.14	6.67	6.76	6.37	6.45	6.12
	W 310 × 45	8.03	7.40	7.52	7.02	7.11	6.71	6.78	6.44

Table A-24
Maximum Spans for Steel Beams Supporting a Roof and one Floor in Dwelling Units Where Beams Support Exterior Stud Walls with Brick Veneer – 2.0 kPa Specified Roof Design Snow Load

Forming Part of Sentence 9.23.4.3(1)

COLUMN 1		COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9
Maximum Span, m									
Roof *Live Load*, kPa		2							
Supported Roof Length, m		2.4		3.6		4.8		6.0	
Supported Floor Length, m		2.4	3.6	2.4	3.6	2.4	3.6	2.4	3.6
Steel Beam Section	W 150 × 22	2.78	2.65	2.64	2.53	2.53	2.43	2.43	2.35
	W 150 × 30	3.13	2.98	2.97	2.85	2.84	2.74	2.73	2.64
	W 150 × 37	3.40	3.24	3.23	3.10	3.09	2.98	2.97	2.88
	W 200 × 27	3.58	3.41	3.40	3.26	3.25	3.13	3.13	3.02
	W 200 × 31	3.82	3.64	3.63	3.48	3.47	3.34	3.34	3.23
	W 200 × 36	3.93	3.74	3.73	3.58	3.57	3.44	3.43	3.32
	W 200 × 42	4.16	3.96	3.96	3.79	3.78	3.64	3.64	3.52
	W 250 × 33	4.43	4.22	4.21	4.03	4.02	3.88	3.87	3.74
	W 250 × 39	4.75	4.52	4.51	4.32	4.31	4.15	4.15	4.01
	W 250 × 49	5.01	4.77	4.76	4.56	4.55	4.38	4.37	4.23
	W 310 × 39	5.33	5.07	5.06	4.85	4.84	4.66	4.65	4.50
	W 310 × 45	5.61	5.34	5.33	5.11	5.10	4.91	4.90	4.74
	W 310 × 52	5.96	5.67	5.66	5.43	5.41	5.21	5.21	5.03
	W 310 × 60	6.12	5.83	5.81	5.57	5.56	5.36	5.35	5.17
	W 360 × 33	5.28	5.03	5.01	4.81	4.80	4.62	4.61	4.46
	W 360 × 39	5.66	5.39	5.38	5.15	5.14	4.95	4.94	4.78
	W 360 × 45	6.01	5.72	5.71	5.47	5.46	5.26	5.25	5.08
	W 360 × 51	6.31	6.00	5.99	5.74	5.73	5.52	5.51	5.33
	W 360 × 57	6.59	6.28	6.26	6.00	5.99	5.77	5.76	5.57

Table A-25
Maximum Spans for Steel Beams Supporting a Roof and one Floor in Dwelling Units Where Beams Support Interior Stud Walls or Exterior Stud Walls with Siding – 2.0 kPa Specified Roof Design Snow Load

Forming Part of Sentence 9.23.4.3(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9
Maximum Span, m								
Roof *Live Load*, kPa	2.0							
Supported Roof Length, m	2.4		3.6		4.8		6.0	
Supported Floor Length, m	2.4	3.6	2.4	3.6	2.4	3.6	2.4	3.6
Steel Beam Section								
W 150 × 22	3.81	3.54	3.53	3.33	3.32	3.13	3.15	2.94
W 150 × 30	4.28	3.98	3.97	3.74	3.73	3.55	3.54	3.39
W 150 × 37	4.66	4.33	4.32	4.70	4.06	3.86	3.85	3.69
W 200 × 27	4.90	4.56	4.54	4.28	4.27	4.06	4.05	3.88
W 200 × 31	5.23	4.86	4.85	4.57	4.56	4.34	4.32	4.14
W 200 × 36	5.38	5.00	4.98	4.07	4.68	4.46	4.45	4.26
W 200 × 42	5.70	5.30	5.28	4.98	4.96	4.72	4.71	4.51
W 250 × 33	6.06	5.64	5.62	5.30	5.28	5.03	5.01	4.80
W 250 × 39	6.49	6.04	6.02	5.67	5.66	5.38	5.37	5.14
W 250 × 49	6.85	6.37	6.35	5.99	5.97	5.68	5.67	5.43
W 310 × 39	7.29	6.78	6.76	6.37	6.35	6.04	6.03	5.77
W 310 × 45	7.68	7.14	7.11	6.71	6.69	6.36	6.35	6.08

Table A-26
Maximum Spans for Steel Beams Supporting a Roof and one Floor in Dwelling Units Where Beams Support Exterior Stud Walls with Brick Veneer – 2.5 kPa Specified Roof Design Snow Load

Forming Part of Sentence 9.23.4.3(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9
Maximum Span, m								
Roof *Live Load*, kPa	2.5							
Supported Roof Length, m	2.4		3.6		4.8		6.0	
Supported Floor Length, m	2.4	3.6	2.4	3.6	2.4	3.6	2.4	3.6
Steel Beam Section								
W 150 × 22	2.71	2.59	2.55	2.46	2.43	2.35	2.33	2.26
W 150 × 30	3.04	2.91	2.87	2.76	2.73	2.64	2.62	2.54
W 150 × 37	3.32	3.17	3.13	3.01	2.97	2.88	2.85	2.77
W 200 × 27	3.49	3.33	3.29	3.16	3.13	3.02	2.99	2.91
W 200 × 31	3.72	3.56	3.51	3.38	3.34	3.23	3.20	3.10
W 200 × 36	3.82	3.65	3.61	3.47	3.43	3.32	3.29	3.19
W 200 × 42	4.05	3.87	3.82	3.68	3.64	3.52	3.48	3.38
W 250 × 33	4.31	4.12	4.07	3.91	3.87	3.74	3.71	3.60
W 250 × 39	4.62	4.41	4.36	4.19	4.15	4.01	3.97	3.85
W 250 × 49	4.87	4.66	4.60	4.42	4.37	4.23	4.19	4.07
W 310 × 39	5.19	4.96	4.89	4.71	4.65	4.50	4.46	4.33
W 310 × 45	5.46	5.22	5.15	4.95	4.90	4.74	4.69	4.55
W 310 × 52	5.80	5.54	5.47	5.26	5.21	5.03	4.98	4.84
W 310 × 60	5.96	5.69	5.62	5.41	5.35	5.17	5.12	4.97
W 360 × 33	5.14	4.91	4.85	4.66	4.61	4.46	4.42	4.29
W 360 × 39	5.51	5.27	5.20	5.00	4.94	4.78	4.73	4.60
W 360 × 45	5.85	5.59	5.52	5.31	5.25	5.08	5.03	4.88
W 360 × 51	6.14	5.87	5.79	5.57	5.51	5.33	5.27	5.12
W 360 × 57	6.42	6.13	6.05	5.82	5.76	5.57	5.51	5.35

Table A-27

Maximum Spans for Steel Beams Supporting a Roof and one Floor in Dwelling Units Where Beams Support Interior Stud Walls or Exterior Stud Walls with Siding – 2.5 kPa Specified Roof Design Snow Load

Forming Part of Sentence 9.23.4.3(1)

COLUMN 1		COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9
Maximum Span, m									
Roof *Live Load*, kPa		2.5							
Supported Roof Length, m		2.4		3.6		4.8		6.0	
Supported Floor Length, m		2.4	3.6	2.4	3.6	2.4	3.6	2.4	3.6
Steel Beam Section	W 150 × 22	3.66	3.43	3.36	3.19	3.15	2.98	2.98	2.79
	W 150 × 30	4.11	3.85	3.78	3.59	3.54	3.39	3.35	3.23
	W 150 × 37	4.48	4.19	4.12	3.91	3.85	3.69	3.64	3.51
	W 200 × 27	4.71	4.41	4.33	4.11	4.05	3.88	3.83	3.69
	W 200 × 31	5.02	4.71	4.62	4.39	4.32	4.14	4.09	3.94
	W 200 × 36	5.16	4.84	4.75	4.51	4.45	4.26	4.21	4.05
	W 200 × 42	5.47	5.13	5.04	4.78	4.71	4.51	4.46	4.30
	W 250 × 33	5.82	5.46	5.36	5.09	5.01	4.80	4.74	4.54
	W 250 × 39	6.24	5.85	5.74	5.45	5.37	5.14	5.08	4.90
	W 250 × 49	6.58	6.17	6.06	5.75	5.67	5.43	5.36	5.17
	W 310 × 39	7.01	6.56	6.45	6.12	6.03	5.78	5.70	5.47
	W 310 × 45	7.37	6.91	6.78	6.44	6.35	6.08	6.00	5.79

Table A-28

Maximum Spans for Steel Beams Supporting a Roof and one Floor in Dwelling Units Where Beams Support Exterior Stud Walls with Brick Veneer – 3.0 kPa Specified Roof Design Snow Load

Forming Part of Sentence 9.23.4.3(1)

COLUMN 1		COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9
Maximum Span, m									
Roof *Live Load*, kPa		3.0							
Supported Roof Length, m		2.4		3.6		4.8		6.0	
Supported Floor Length, m		2.4	3.6	2.4	3.6	2.4	3.6	2.4	3.6
Steel Beam Section	W 150 × 22	2.64	2.53	2.48	2.39	2.35	2.28	2.24	2.18
	W 150 × 30	2.97	2.85	2.78	2.69	2.64	2.56	2.52	2.45
	W 150 × 37	3.23	3.10	3.03	2.93	2.87	2.79	2.74	2.67
	W 200 × 27	3.40	3.26	3.19	3.08	3.02	2.93	2.88	2.81
	W 200 × 31	3.63	3.48	3.40	3.28	3.22	3.13	3.08	3.00
	W 200 × 36	3.73	3.58	3.50	3.38	3.31	3.21	3.16	3.08
	W 200 × 42	3.96	3.79	3.71	3.58	3.51	3.41	3.35	3.26
	W 250 × 33	4.21	4.03	3.94	3.81	3.74	3.62	3.57	3.47
	W 250 × 39	4.51	4.32	4.23	4.08	4.00	3.88	3.82	3.72
	W 250 × 49	4.76	4.56	4.46	4.30	4.22	4.10	4.03	3.93
	W 310 × 39	5.06	4.85	4.74	4.58	4.49	4.36	4.29	4.18
	W 310 × 45	5.33	5.11	4.99	4.82	4.73	4.59	4.51	4.40
	W 310 × 52	5.66	5.43	5.31	5.12	5.03	4.88	4.80	4.67
	W 310 × 60	5.81	5.57	5.45	5.26	5.16	5.01	4.93	4.80
	W 360 × 33	5.01	4.81	4.70	4.54	4.45	4.32	4.25	4.14
	W 360 × 39	5.38	5.15	5.04	4.86	4.77	4.63	4.56	4.44
	W 360 × 45	5.71	5.47	5.35	5.16	5.07	4.92	4.84	4.71
	W 360 × 51	5.99	5.74	5.61	5.42	5.32	5.16	5.08	4.94
	W 360 × 57	6.26	6.00	5.87	5.66	5.56	5.39	5.31	5.17

Table A-29
Maximum Spans for Steel Beams Supporting a Roof and one Floor in Dwelling Units Where Beams Support Interior Stud Walls or Exterior Stud Walls with Siding – 3.0 kPa Specified Roof Design Snow Load

Forming Part of Sentence 9.23.4.3(1)

COLUMN 1		COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9
Maximum Span, m									
Roof *Live Load*, kPa		3.0							
Supported Roof Length, m		2.4		3.6		4.8		6.0	
Supported Floor Length, m		2.4	3.6	2.4	3.6	2.4	3.6	2.4	3.6
Steel Beam Section	W 150 × 22	3.53	3.33	3.23	3.08	3.01	2.85	2.83	2.66
	W 150 × 30	3.97	3.74	3.63	3.47	3.38	3.26	3.19	3.09
	W 150 × 37	4.32	4.07	3.95	3.77	3.68	3.55	3.48	3.37
	W 200 × 27	4.54	4.28	4.15	3.97	3.87	3.73	3.65	3.52
	W 200 × 31	4.85	4.57	4.43	4.23	4.13	3.98	3.90	3.78
	W 200 × 36	4.98	4.70	4.56	4.35	4.25	4.09	4.01	3.88
	W 200 × 42	5.28	4.98	4.83	4.61	4.50	4.34	4.25	4.12
	W 250 × 33	5.62	5.30	5.14	4.91	4.79	4.61	4.52	4.33
	W 250 × 39	6.02	5.67	5.51	5.26	5.13	4.94	4.84	4.69
	W 250 × 49	6.35	5.99	5.81	5.55	5.42	5.21	5.11	4.95
	W 310 × 39	6.76	6.37	6.18	5.90	5.76	5.55	5.44	5.21
	W 310 × 45	7.11	6.71	6.51	6.21	6.07	5.84	5.72	5.54

Table A-30
Sizes for Spruce-Pine-Fir No. 2 Grade Exterior Wall Studs with Brick Veneer

Forming Part of Sentence 9.23.10.1.(2)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8
Stud Size and Spacing							
Wind Pressure, kPa	q_{30}	0.4		0.5		0.55	
	q_{10}	0.3		0.4		0.46	
Specified Roof DesignSnow Load, kPa	Stud Length, m	Supported Roof Length, m		Supported Roof Length, m		Supported Roof Length, m	
		3.0	6.0	3.0	6.0	3.0	6.0
1.0	3.8	A	A	A	A	A	A
	4.2	A	A	B	B	B	B
	4.6	B	B	C	C	C	C
	5.0	C	C	C	C	D	D
	5.3	C	C	D	D	D	D
	5.6	C	C	D	D		
1.5	3.8	A	A	A	A	A	A
	4.2	A	A	B	B	B	B
	4.6	B	B	C	C	C	C
	5.0	C	C	C	C	D	D
	5.3	C	C	D	D	D	D
	5.6	C	C	D	D		
2.0	3.8	A	A	A	A	A	A
	4.2	A	A	B	B	B	B
	4.6	B	B	C	C	C	C
	5.0	C	C	C	C	D	D
	5.3	C	C	D	D	D	D
	5.6	C	C	D	D		
2.5	3.8	A	A	A	A	A	A
	4.2	A	A	B	B	B	B
	4.6	B	B	C	C	C	C
	5.0	C	C	C	C	D	D
	5.3	C	C	D	D	D	D
	5.6	C	C	D	D		

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8
Stud Size and Spacing							
Wind Pressure, kPa	q_{30}	0.4		0.5		0.55	
	q_{10}	0.3		0.4		0.46	
Specified Roof DesignSnow Load, kPa	Stud Length, m	Supported Roof Length, m		Supported Roof Length, m		Supported Roof Length, m	
		3.0	6.0	3.0	6.0	3.0	6.0
3.0	3.8	A	A	A	A	A	A
	4.2	A	A	B	B	B	B
	4.6	B	B	C	C	C	C
	5.0	C	C	C	C	D	D
	5.3	C	C	D	D	D	D
	5.6	C	C	D	D		

Legend – Stud Size and Spacing

A = 38 × 140 mm at 400 mm on centre C = two 38 × 140 mm studs at 400 mm centre

B = 38 × 140 mm at 300 mm on centre D = two 38 × 140 mm studs at 300 mm centre

Notes to Table A-30:

(1) A roof dead load of 0.62 kPa has been assumed.

(2) It is assumed that the double top plate is rigid enough to distribute the roof load equally to the studs regardless of spacing.

(3) Solid bridging shall be provided at 1 200 mm on centre.

(4) The studs shall have a minimum of 9.5 mm plywood, waferboard or OSB sheathing on the exterior face and 12.5 mm gypsum board on the interior face.

Table A-31
Sizes for Spruce-Pine-Fir No. 2 Grade Exterior Wall Studs with Siding

Forming Part of Sentence 9.23.10.1.(2)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8
Stud Size and Spacing							
Wind Pressure, kPa	q_{30}	0.4		0.5		0.55	
	q_{10}	0.3		0.4		0.46	
Specified Roof Design Snow Load, kPa	Stud Length, m	Supported Roof Length, m		Supported Roof Length, m		Supported Roof Length, m	
		3.0	6.0	3.0	6.0	3.0	6.0
1.0	3.8	A	A	A	A	A	A
	4.2	A	A	A	A	A	A
	4.6	A	A	A	A	A	A
	5.0	A	A	A	A	B	B
	5.3	A	A	B	B	B	B
	5.6	A	A	B	B	C	C
1.5	3.8	A	A	A	A	A	A
	4.2	A	A	A	A	A	A
	4.6	A	A	A	A	A	A
	5.0	A	A	A	A	B	B
	5.3	A	A	B	B	B	B
	5.6	A	A	B	B	C	C
2.0	3.8	A	A	A	A	A	A
	4.2	A	A	A	A	A	A
	4.6	A	A	A	A	A	A
	5.0	A	A	A	A	B	B
	5.3	A	A	B	B	B	B
	5.6	A	B	B	B	C	C

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8
Stud Size and Spacing							
Wind Pressure, kPa	q_{30}	0.4		0.5		0.55	
	q_{10}	0.3		0.4		0.46	
Specified Roof Design Snow Load, kPa	Stud Length, m	Supported Roof Length, m		Supported Roof Length, m		Supported Roof Length, m	
		3.0	6.0	3.0	6.0	3.0	6.0
2.5	3.8	A	A	A	A	A	A
	4.2	A	A	A	A	A	A
	4.6	A	A	A	A	A	A
	5.0	A	A	A	A	B	B
	5.3	A	B	B	B	B	B
	5.6	A	B	B	B	C	C
3.0	3.8	A	A	A	A	A	A
	4.2	A	A	A	A	A	A
	4.6	A	A	A	A	A	A
	5.0	A	A	A	B	B	B
	5.3	A	B	B	B	B	B
	5.6	A	B	B	C	C	C

Legend – Stud Size and Spacing

A = 38 × 140 mm at 400 mm on centre C = two 38 × 140 mm studs at 400 mm centre

B = 38 × 140 mm at 300 mm on centre D = two 38 × 140 mm studs at 300 mm centre

Notes to Table A-31:

(1) A roof dead load of 0.62 kPa has been assumed.

(2) It is assumed that the double top plate is rigid enough to distribute the roof load equally to the studs regardless of spacing.

(3) Solid bridging shall be provided at 1 200 mm on centre.

(4) The studs shall have a minimum of 9.5 mm plywood, waferboard or OSB sheathing on the exterior face and 12.5 mm gypsum board on the interior face.

Table A-32
Sizes for Northern Species No. 2 Grade Exterior Wall Studs with Brick Veneer

Forming Part of Sentence 9.23.10.1.(2)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8
Stud Size and Spacing							
Wind Pressure, kPa	q_{30}	0.4		0.5		0.55	
	q_{10}	0.3		0.4		0.46	
Specified Roof Design Snow Load, kPa	Stud Length, m	Supported Roof Length, m		Supported Roof Length, m		Supported Roof Length, m	
		3.0	6.0	3.0	6.0	3.0	6.0
1.0	3.8	A	A	B	B	B	B
	4.2	B	B	C	C	C	C
	4.6	C	C	C	C	D	D
	5.0	C	C	D	D		
	5.3	D	D				
	5.6						
1.5	3.8	A	A	B	B	B	B
	4.2	B	B	C	C	C	C
	4.6	C	C	C	C	D	D
	5.0	C	C	D	D		
	5.3	D	D				
	5.6						
2.0	3.8	A	A	B	B	B	B
	4.2	B	B	C	C	C	C
	4.6	C	C	C	C	D	D
	5.0	C	C	D	D		
	5.3	D	D				
	5.6						

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8
Stud Size and Spacing							
Wind Pressure, kPa	q_{30}	0.4		0.5		0.55	
	q_{10}	0.3		0.4		0.46	
Specified Roof Design Snow Load, kPa	Stud Length, m	Supported Roof Length, m		Supported Roof Length, m		Supported Roof Length, m	
		3.0	6.0	3.0	6.0	3.0	6.0
2.5	3.8	A	A	B	B	B	B
	4.2	B	B	C	C	C	C
	4.6	C	C	C	C	D	D
	5.0	C	C	D	D		
	5.3	D	D				
	5.6						
3.0	3.8	A	A	B	B	B	B
	4.2	B	B	C	C	C	C
	4.6	C	C	C	C	D	D
	5.0	C	C	D	D		
	5.3	D	D				
	5.6						

Legend – Stud Size and Spacing

A = 38 × 140 mm at 400 mm on centre C = two 38 × 140 mm studs at 400 mm on centre

B = 38 × 140 mm at 300 mm on centre D = two 38 × 140 mm studs at 300 mm on centre

Notes to Table A-32:

(1) A roof dead load of 0.62 kPa has been assumed.

(2) It is assumed that the double top plate is rigid enough to distribute the roof load equally to the studs regardless of spacing.

(3) Solid bridging shall be provided at 1 200 mm on centre.

(4) The studs shall have a minimum of 9.5 mm plywood, waferboard or OSB sheathing on the exterior face and 12.5 mm gypsum board on the interior side.

Table A-33
Sizes for Northern Species No. 2 Grade Exterior Wall Studs with Siding

Forming Part of Sentence 9.23.10.1.(2)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8
Stud Size and Spacing							
Wind Pressure, kPa	q_{30}	0.4		0.5		0.55	
	q_{10}	0.3		0.4		0.46	
Specified Roof Design Snow Load, kPa	Stud Length, m	Supported Roof Length, m		Supported Roof Length, m		Supported Roof Length, m	
		3.0	6.0	3.0	6.0	3.0	6.0
1.0	3.8	A	A	A	A	A	A
	4.2	A	A	A	A	A	A
	4.6	A	A	A	A	B	B
	5.0	A	A	B	B	C	C
	5.3	B	B	C	C	C	C
	5.6	C	C	C	C	D	D
1.5	3.8	A	A	A	A	A	A
	4.2	A	A	A	A	A	A
	4.6	A	A	A	A	B	B
	5.0	A	B	B	B	C	C
	5.3	B	B	C	C	C	C
	5.6	C	C	C	C	D	D
2.0	3.8	A	A	A	A	A	A
	4.2	A	A	A	A	A	A
	4.6	A	A	A	B	B	B
	5.0	A	B	B	B	C	C
	5.3	B	B	C	C	C	C
	5.6	C	C	C	C	D	D

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8
Stud Size and Spacing							
Wind Pressure, kPa	q_{30}	0.4		0.5		0.55	
	q_{10}	0.3		0.4		0.46	
Specified Roof Design Snow Load, kPa	Stud Length, m	Supported Roof Length, m		Supported Roof Length, m		Supported Roof Length, m	
		3.0	6.0	3.0	6.0	3.0	6.0
2.5	3.8	A	A	A	A	A	A
	4.2	A	A	A	A	A	B
	4.6	A	B	A	B	B	B
	5.0	A	B	B	C	C	C
	5.3	B	C	C	C	C	C
	5.6	C	C	C	C	D	D
3.0	3.8	A	A	A	A	A	A
	4.2	A	A	A	B	A	B
	4.6	A	B	A	B	B	B
	5.0	A	C	B	C	C	C
	5.3	B	C	C	C	C	C
	5.6	C	C	C	C	D	D

Legend – Stud Size and Spacing

A = 38 × 140 mm at 400 mm on centre C = two 38 × 140 mm studs at 400 mm on centre

B = 38 × 140 mm at 300 mm on centre D = two 38 × 140 mm studs at 300 mm on centre

Notes to Table A-33:

(1) A roof dead load of 0.62 kPa has been assumed.

(2) It is assumed that the double top plate is rigid enough to distribute the roof load equally to the studs regardless of spacing.

(3) Solid bridging shall be provided at 1.2 m on centre.

(4) The studs shall have a minimum of 9.5 mm plywood, waferboard or OSB sheathing on the exterior face and 12.5 mm gypsum board on the interior face.

Table A-34
Minimum Number of 38 × 89 mm Spruce-Pine-Fir Stud Posts in Exterior Stud Walls Supporting Girder Trusses and Roof Beams

Forming Part of Sentence 9.23.10.7(2)

COL. 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Minimum Number of Studs																					
Stud Height, m	Span of Beam or Girder, m	Specified Roof Design Snow Load, kPa																			
		1.0				1.5				2.0				2.5				3.0			
		Supported Length, m				Supported Length, m				Supported Length, m				Supported Length, m				Supported Length, m			
		2.4	3.6	4.8	6.0	2.4	3.6	4.8	6.0	2.4	3.6	4.8	6.0	2.4	3.6	4.8	6.0	2.4	3.6	4.8	6.0
2.4	2.4	1	1	2	2	1	2	2	2	1	2	2	3	2	2	3	3	2	2	3	3
	3.6	1	2	2	2	2	2	3	3	2	2	3	4	2	3	4	4	2	3	4	5
	4.8	2	2	3	3	2	3	3	4	2	3	4	5	3	4	5		3	4	5	
	6.0	2	2	3	4	2	3	4	5	3	4	5		3	4			3	5		
	7.2	2	3	4	4	3	4	5		3	4			4	5			4			
	8.4	2	3	4	5	3	4	5		3	5			4				5			
	9.6	3	4	5		3	5			4				5				5			
	10.8	3	4	5		4	5			4				5							
	12.0	3	4			4				5											
3.0	2.4	1	2	2	2	2	2	3	3	2	2	3	4	2	3	4	4	2	3	4	5
	3.6	2	2	3	3	2	3	4	4	2	3	4	5	3	4	5		3	4		
	4.8	2	3	4	4	3	4	5		3	4			4	5			4			
	6.0	2	3	4	5	3	4			4	5			4				5			
	7.2	3	4	5		4	5			4				5							
	8.4	3	4			4				5											
	9.6	4	5			5															
	10.8	4				5															
	12.0	4																			

Notes to Table A-34:

(1) A roof dead load of 0.62 kPa has been assumed.

(2) Roof beams require a minimum bearing length of 89 mm.

(3) Girder trusses require a minimum bearing length of 89 mm unless otherwise specified by the truss manufacturer.

Table A-35
Minimum Number of 38 × 140 mm Spruce-Pine-Fir Stud Posts in Exterior Stud Walls Supporting Girder Trusses and Roof Beams

Forming Part of Sentence 9.23.10.7(2)

COL. 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Minimum Number of Studs																					
Stud Height, m	Span of Beam or Girder, m	Specified Roof Design Snow Load, kPa																			
		1.0				1.5				2.0				2.5				3.0			
		Supported Length, m				Supported Length, m				Supported Length, m				Supported Length, m				Supported Length, m			
		2.4	3.6	4.8	6.0	2.4	3.6	4.8	6.0	2.4	3.6	4.8	6.0	2.4	3.6	4.8	6.0	2.4	3.6	4.8	6.0
3.0	2.4	1	1	1	1	1	1	1	1	1	1	1	2	1	1	2	2	1	1	2	2
	3.6	1	1	1	1	1	1	2	2	1	1	2	2	1	2	2	2	1	2	2	3
	4.8	1	1	2	2	1	2	2	2	1	2	2	3	2	2	3	3	2	2	3	4
	6.0	1	1	2	2	1	2	2	3	2	2	3	3	2	2	3	4	2	3	4	4
	7.2	1	2	2	2	2	2	3	3	2	2	3	4	2	3	4	4	2	3	4	5
	8.4	1	2	2	3	2	2	3	4	2	3	4	4	2	3	4	5	3	4	5	
	9.6	2	2	3	3	2	3	3	4	2	3	4	5	3	4	5		3	4	5	
	10.8	2	2	3	3	2	3	4	4	2	3	4	5	3	4	5		3	5		
	12.0	2	2	3	4	2	3	4	5	3	4	5		3	4			4	5		
3.6	2.4	1	1	1	1	1	1	1	2	1	1	2	2	1	1	2	2	1	2	2	2
	3.6	1	1	1	2	1	1	2	2	1	2	2	3	1	2	2	3	2	2	3	3
	4.8	1	1	2	2	1	2	2	3	2	2	3	3	2	2	3	4	2	3	4	4
	6.0	1	2	2	3	2	2	3	3	2	3	3	4	2	3	4	5	2	3	4	5
	7.2	1	2	2	3	2	2	3	4	2	3	4	5	2	3	4	5	3	4	5	
	8.4	2	2	3	3	2	3	4	4	2	3	4	5	3	4	5		3	4		
	9.6	2	2	3	4	2	3	4	5	3	4	5		3	4			4	5		
	10.8	2	3	3	4	2	3	4	5	3	4	5		3	5			4			
	12.0	2	3	4	5	3	4	5		3	5			4	5			4			

Notes to Table A-35:

(1) A roof dead load of 0.62 kPa has been assumed.

(2) Roof beams require a minimum bearing length of 140 mm.

(3) Girder trusses require a minimum bearing length of 140 mm unless otherwise specified by the truss manufacturer.

Table A-36
Minimum Number of 38 × 89 mm Northern Species Stud Posts in Exterior Stud Walls Supporting Girder Trusses and Roof Beams

Forming Part of Sentence 9.23.10.7(2)

COL. 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Minimum Number of Studs																					
Stud Height, m	Span of Beam or Girder, m	Specified Roof Design Snow Load, kPa																			
		1.0				1.5				2.0				2.5				3.0			
		Supported Length, m				Supported Length, m				Supported Length, m				Supported Length, m				Supported Length, m			
		2.4	3.6	4.8	6.0	2.4	3.6	4.8	6.0	2.4	3.6	4.8	6.0	2.4	3.6	4.8	6.0	2.4	3.6	4.8	6.0
2.4	2.4	1	2	2	2	2	2	3	3	2	2	3	4	2	3	4	4	2	3	4	5
	3.6	2	2	3	3	2	3	4	4	2	3	4	5	3	4	5		3	4		
	4.8	2	3	4	4	3	4	5		3	4			4	5			4			
	6.0	2	3	4	5	3	4			4	5			4				5			
	7.2	3	4	5		4	5			4				5							
	8.4	3	4			4				5											
	9.6	4	5			5															
	10.8	4				5															
	12.0	4																			

Col. 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Minimum Number of Studs																					
Stud Height, m	Span of Beam or Girder, m	Specified Roof Design Snow Load, kPa																			
		1.0				1.5				2.0				2.5				3.0			
		Supported Length, m				Supported Length, m				Supported Length, m				Supported Length, m				Supported Length, m			
		2.4	3.6	4.8	6.0	2.4	3.6	4.8	6.0	2.4	3.6	4.8	6.0	2.4	3.6	4.8	6.0	2.4	3.6	4.8	6.0
3.0	2.4	2	2	3	3	2	3	3	4	2	3	4	5	3	4	5		3	4		
	3.6	2	3	4	5	3	4	5		3	5			4	5			4			
	4.8	3	4	5		3	5			4				5							
	6.0	3	5			4				5											
	7.2	4	5			5															
	8.4	4																			
	9.6	5																			
	10.8	5																			
	12.0																				

Notes to Table A-36:

(1) A roof dead load of 0.62 kPa has been assumed.

(2) Roof beams require a minimum bearing length of 89 mm.

(3) Girder trusses require a minimum bearing length of 89 mm unless otherwise specified by the truss manufacturer.

Table A-37
Minimum Number of 38 × 140 mm Northern Species Stud Posts in Exterior Stud Walls Supporting Girder Trusses and Roof Beams

Forming Part of Sentence 9.23.10.7(2)

Col. 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Minimum Number of Studs																					
Stud Height, m	Span of Beam or Girder, m	Specified Roof Design Snow Load, kPa																			
		1.0				1.5				2.0				2.5				3.0			
		Supported Length, m				Supported Length, m				Supported Length, m				Supported Length, m				Supported Length, m			
		2.4	3.6	4.8	6.0	2.4	3.6	4.8	6.0	2.4	3.6	4.8	6.0	2.4	3.6	4.8	6.0	2.4	3.6	4.8	6.0
3.0	2.4	1	1	1	1	1	1	2	2	1	1	2	2	1	2	2	2	1	2	2	3
	3.6	1	1	2	2	1	2	2	2	1	2	2	3	2	2	3	3	2	3	3	4
	4.8	1	2	2	2	2	2	3	3	2	2	3	4	2	3	4	4	2	3	4	5
	6.0	1	2	2	3	2	2	3	4	2	3	4	5	2	3	4	5	3	4	5	
	7.2	2	2	3	3	2	3	4	4	2	3	4	5	3	4	5		3	5		
	8.4	2	3	3	4	2	3	4	5	3	4	5		3	5			4	5		
	9.6	2	3	4	4	3	4	5		3	4			4	5			4			
	10.8	2	3	4	5	3	4	5		3	5			4				5			
	12.0	2	3	4	5	3	4			4	5			4				5			
3.6	2.4	1	1	1	2	1	1	2	2	1	2	2	3	1	2	2	3	2	2	3	3
	3.6	1	2	2	2	1	2	2	3	2	2	3	4	2	3	3	4	2	3	4	5
	4.8	1	2	2	3	2	2	3	4	2	3	4	5	2	3	4	5	3	4	5	
	6.0	2	2	3	4	2	3	4	5	3	4	5		3	4	5		3	5		
	7.2	2	3	3	4	2	3	4	5	3	4	5		3	5			4			
	8.4	2	3	4	5	3	4	5		3	5			4				4			
	9.6	2	3	4	5	3	4			4	5			4				5			
	10.8	3	4	5		3	5			4				5							
	12.0	3	4	5		4	5			5				5							

Notes to Table A-37:

(1) A roof dead load of 0.62 kPa has been assumed.

(2) Roof beams require a minimum bearing length of 140 mm.

(3) Girder trusses require a minimum bearing length of 140 mm unless otherwise specified by the truss manufacturer.

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PART 10
CHANGE OF USE

Section 10.1. General
10.1.1. Scope

Section 10.2. Classification of Existing Buildings
10.2.1. Classification

Section 10.3. Requirements
10.3.1. General
10.3.2. Performance Level

Section 10.4. Compliance Alternatives
10.4.1. Compliance Alternatives

PART 10
CHANGE OF USE

Section 10.1. General

10.1.1. Scope

10.1.1.1. Scope

(1) The scope of this Part shall be as described in Subsection 1.1.2. of Division A.

10.1.1.2. Change in Major Occupancy

(1) The following changes of use shall also be deemed to be a change in *major occupancy* for the purposes of this Part:

(a) a *suite* of a Group C *major occupancy* is converted into more than one *suite* of a Group C *major occupancy*,

(b) a *suite* or part of a *suite* of a Group A, Division 2 or Group A, Division 4 *major occupancy* is converted to a *gaming premises*,

(c) a *farm building* or part of a *farm building* is changed to a *major occupancy*,

(d) a *building* or part of a *building* is changed to a *post-disaster building*, or

(e) the use of a *building* or part of a *building* is changed and the previous *major occupancy* of the *building* or part of the *building* cannot be determined.

10.1.1.3. Definitions

(1) In this Part, the following words and terms have the meaning that they are given in Article 11.1.1.2.:

Building system

Section 10.2. Classification of Existing Buildings

10.2.1. Classification

10.2.1.1. Classification of Major Occupancy

(1) Every existing *building* or part of it shall be classified according to its *major occupancy* in accordance with the requirements of Subsection 3.1.2.

10.2.1.2. Classification According to Construction and Occupancy

(1) For the purposes of this Part, existing *buildings* shall be classified as to their *construction* and *occupancy* as provided for in Sentence 11.2.1.1.(1).

10.2.1.3. Building Size and Construction

(1) The requirements of Articles 3.2.2.20. to 3.2.2.83. do not apply to this Part.

Section 10.3. Requirements

10.3.1. General

10.3.1.1. General

(1) Except as provided in Section 10.4., a *building* or part of a *building* subject to a change of *major occupancy* shall conform to the requirements of Subsection 3.2.6., Sections 3.7., 3.11., 3.12., 9.5. and 9.7., Subsection 9.10.17., Sections 9.31. and 9.32., and Subsections 9.34.1. to 9.34.3. as they apply to the new *major occupancy* that the *building* or part of a *building* is to support.

10.3.2. Performance Level

10.3.2.1. General

(1) The *performance level* of a *building* after the change of *major occupancy* shall not be less than the *performance level* prior to the change of *major occupancy*.

(2) For the purposes of Sentence (1), reduction of *performance level* shall be determined in accordance with Article 10.3.2.2.

10.3.2.2. Reduction in Performance Level

(1) Except as provided in Sentence (2), the *performance level* of a *building* or part of a *building* is reduced where the existing structural floor and roof framing systems and their supporting members are not adequate to support the proposed *dead loads* and *live loads* of the new *major occupancy* that the *building* is to support.

(2) The inadequacy of the existing structural floor or roof framing system and its supporting members to support the proposed *dead loads* and *live loads* does not reduce the *performance level* of the *building* if the portion of the floor affected by the proposed loads is restricted to the loading it will support and signs stating the restrictions are posted.

(3) Except as provided in Section 10.4., the *performance level* of a *building* or part of a *building* is reduced where the early warning and evacuation systems requirements of the *building* do not meet the early warning and evacuation systems requirements set out in Table 10.3.2.2.A. for the new *major occupancy* that the *building* is to support.

Table 10.3.2.2.A.
For Evaluation of Early Warning/Evacuation

Forming Part of Sentence 10.3.2.2.(3)

COLUMN 1	COLUMN 2
Early Warning / Evacuation Evaluation	Compliance Alternative(1)
Early Warning and Evacuation to be checked against	EARLY WARNING
(a) *access to exit* widths based on *occupant load* in Subsection 3.3.1. or 9.9.3.; (b) *exit* widths based on *occupant load* in Subsection 3.4.3. or 9.9.3.; (c) *exit* signs in Subsection 3.4.5. or 9.9.10.; (d) lighting of *exits*, lighting of *access to exits* and emergency lighting in Subsection 3.2.7. or 9.9.11.; (e) fire alarm system in Subsection 3.2.4. or 9.10.18.; (f) *smoke alarms* in Subsection 9.10.19.; (g) travel distance and number of *exits* in other Parts of this Division; (h) smoke control measures, and at least one elevator to permit transport of fire fighters to all floors in *hotels* whose floor level is more than 18 m high, measured between *grade* and floor level of the top *storey* as per Subsection 3.2.6.; and (i) door release hardware requirements in Articles 3.3.1.12. and 3.4.6.15., and deficiencies shall be upgraded.	(a) *Compliance alternatives* as listed may be used. EVACUATION (b) *Compliance alternatives* as listed to *access to exit* and *exit* widths, number of *exits*, door release hardware, and travel distance may be used.

Notes to Table 10.3.2.2.A.:

(1) See Tables 11.5.1.1.A., 11.5.1.1.B., 11.5.1.1.C., 11.5.1.1.D/E. and 11.5.1.1.F. for *compliance alternatives* that may be used.

(4) Except as provided in Sentence (5), the *performance level* of an existing *building* is reduced where a change in use will result in a change of the *major occupancy* of all or part of an existing *building* to another *major occupancy* of a greater *hazard index*.

(5) Except as provided in Sentence (6), if the *hazard index* of the new *major occupancy* is greater than the *hazard index* of the existing *major occupancy*, the *performance level* is not reduced where the *hazard index* of the new *major occupancy* is not greater than the *construction index* of the existing *building*.

(6) Small or medium sized existing *buildings* as determined in Tables 11.2.1.1.B to 11.2.1.1.N. facing multiple streets may be assigned a *hazard index* credit of 1, which may be subtracted from the *hazard index* of the new *major occupancy* provided,

(a) the *building* does not contain a Group B, Division 1, a Group C, or a Group F, Division 1 *occupancy*, and

(b) fire fighting access complying with Articles 3.2.5.1., 3.2.5.2., 3.2.5.3., 3.2.5.4. and 3.2.5.5. or Subsection 9.10.20., or an approved *alternative measure* is provided from all *streets*.

(7) Except as provided in Sentence (8), the *performance level* of a *building* or part of a *building* is reduced in an existing *building* constructed of *combustible construction* where,

(a) the *occupancy* is changed to a *residential occupancy* in all or part of the *building*, and

(b) if the *building* was new, it would have been required to be constructed of *noncombustible construction*.

(8) A change in the *occupancy* of a *building* or part of a *building* to a *residential occupancy* does not reduce the *performance level* of the *building* or part of the *building* where,

(a) the *building* is *sprinklered*, and

(b) the *building* does not exceed 6 *storeys* in *building height*.

(9) The *performance level* of a *building* or part of a *building* is reduced where the new *major occupancy* in an existing *building* of multiple *occupancy* is not separated from adjoining *major occupancies* by *fire separations* having *fire-resistance ratings* conforming to Article 3.1.3.1., Subsection 9.10.9. or Table 10.3.2.2.B.

Table 10.3.2.2.B.(1)
Additional Upgrading for Multiple Major Occupancies

Forming Part of Sentence 10.3.2.2.(9)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
New *Major Occupancy*	Code Requirements	*Compliance Alternative*	
All(2)	Table 3.1.3.1. and Subsection 9.10.9. Where:	For Existing *Building* Reduce to	If *Sprinklered* Reduce to
	1 h rating required	45 min	30 min
	2 h rating required	1.5 h	1 h
	3 h rating required	2 h	1.5 h

Notes to Table 10.3.2.2.B.:

(1) For *buildings* with multiple *major occupancies* only, where there is a change in *major occupancy*.

(2) See Sentence 10.3.2.2.(9).

(10) The *performance level* of a *building* is reduced where the *building* after the change of *major occupancy* will not comply with Articles 3.1.3.2. or 9.10.9.12.

(11) The *performance level* of a *building* or part of a *building* is reduced where, after a change of *major occupancy*,

(a) the total daily design *sanitary sewage flow* of the new *major occupancy*, calculated in accordance with Article 8.2.1.3., exceeds the capacity of any component of a *sewage system* serving the *building*, or

(b) the type or amount of *sanitary sewage* that will, under the new *major occupancy*, be discharged to a *sewage system* serving the *building* is prohibited by Article 8.1.3.1.

Section 10.4. Compliance Alternatives

10.4.1. Compliance Alternatives

10.4.1.1. Substitution

(1) Except as provided in Sentence (3), a *compliance alternative* to a requirement contained in Part 3, 4, 5, 6 or 7 that is shown in Tables 11.5.1.1.A., 11.5.1.1.B., 11.5.1.1.C., 11.5.1.1.D/E. or 11.5.1.1.F. may be substituted for the requirement where the *chief building official* is satisfied that compliance with the requirement is impracticable because,

(a) of structural or *construction* difficulties, or

(b) it is detrimental to the preservation of a *heritage building*.

(2) Except as provided in Sentence (3), a *compliance alternative* to a requirement contained in Part 9 shown in Tables 11.5.1.1.C., 11.5.1.1.D/E. or 11.5.1.1.F. may be substituted for the requirement without satisfying the *chief building official* that the requirement is impracticable.

(3) Where the *building* has been in existence for less than five years, *compliance alternatives* may only be used in respect of requirements of this Division that are referenced in Sentences 10.3.2.2.(3), (5) and Table 10.3.2.2.B.

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PART 11
RENOVATION

Section 11.1. General
11.1.1. Scope
11.1.2. Application

Section 11.2. Classification of Existing Buildings
11.2.1. Classification

Section 11.3. Proposed Construction
11.3.1. New and Existing Building Systems
11.3.2. Extension of Buildings
11.3.3. Renovation
11.3.4. Plumbing
11.3.5. Sewage Systems

Section 11.4. Performance Level Evaluation and Compensating Construction
11.4.1. General
11.4.2. Reduction in Performance Level
11.4.3. Compensating Construction

Section 11.5. Compliance Alternatives
11.5.1. Compliance Alternatives

Section 11.1. General

11.1.1. Scope

11.1.1.1. Scope

(1) The scope of this Part shall be as described in Subsection 1.1.2. of Division A.

11.1.1.2. Definitions

(1) In this Part,

Building system means a combination of elements or components that form a complete major division of *construction* in the design of a *building* or part of a *building*, including a structural or framing system, a waterproofing system, a *drainage system*, an *exterior cladding* system, a roofing system, a window system, a *partition* system, a corridor system, a stair system, a fire alarm and detection system, a sprinkler system or a heating, ventilation or *air conditioning* system, a *foundation* system, a standpipe and hose system, a flooring system, a *plumbing system*, a *sewage system* or an electrical system.

11.1.2. Application

11.1.2.1. Extension, Material Alteration or Repair

(1) Where an existing *building* is subject to extension, material alteration or repair,

(a) the proposed *construction* shall comply with Section 11.3., and

(b) the *performance level* of the *building* shall be evaluated and compensating *construction* shall be undertaken in accordance with Section 11.4.

Section 11.2. Classification of Existing Buildings

11.2.1. Classification

11.2.1.1. Construction Index and Hazard Index

(1) Where proposed *construction* will result in the change of *major occupancy* of all or part of an existing *building* to another *major occupancy*, the *building* shall be classified as to its,

(a) *construction* on the basis of *construction index* as provided for in this Part including Table 11.2.1.1.A., and

(b) *occupancy* on the basis of *hazard index* as provided for in this Part including Tables 11.2.1.1.B. to 11.2.1.1.N.

(2) Small or medium sized existing *buildings* as determined in Tables 11.2.1.1.B. to 11.2.1.1.N. facing multiple *streets* may be assigned a *hazard index* credit of 1, which may be subtracted from the *hazard index* of the proposed *major occupancy* to reduce the additional upgrading required by Table 11.4.3.4.A. provided,

(a) the *building* does not contain a Group B, Division 1; a Group C, or a Group F, Division 1 *occupancy*, and

(b) fire fighting access complying with Articles 3.2.5.1., 3.2.5.2., 3.2.5.3., 3.2.5.4. and 3.2.5.5. or Subsection 9.10.20., or an approved *alternative measure*, is provided from all *streets*.

(3) The requirements of Articles 3.2.2.20. to 3.2.2.83. do not apply to this Part.

11.2.1.2. Multiple Occupancies

(1) The classification of an existing *building* of multiple *occupancy* under Article 11.2.1.1. shall be applied according to Articles 3.2.2.5. to 3.2.2.8.

11.2.1.3. Prohibition of Occupancy Combinations

(1) Nothing in this Part relieves an applicant from complying with the requirements of Articles 3.1.3.2. or 9.10.9.12.

Section 11.3. Proposed Construction

11.3.1. New and Existing Building Systems

11.3.1.1. Material Alteration or Repair of a Building System

(1) Where an existing *building system* is materially altered or repaired, the *performance level* of the *building* after the material alteration or repair shall be at least equal to the *performance level* of the *building* prior to the material alteration or repair.

11.3.1.2. New Building Systems and Extension of Existing Building Systems

(1) Except as provided in Article 11.3.3.1. and Section 11.5., the design and *construction* of a new *building system* or the extension of an existing *building system*, shall comply with all other Parts.

11.3.2. Extension of Buildings

11.3.2.1. Portion of Extended Buildings

(1) Where an existing *building* is extended,

(a) this Part applies to the existing portion of the *building*, and

(b) the extended portion of the *building* shall comply with all other Parts.

11.3.3. Renovation

11.3.3.1. Basic Renovation

(1) Except as provided in Sentence (2) and Article 11.3.3.2., *construction* may be carried out to maintain the existing *performance level* of all or part of an existing *building*, by the reuse, relocation or extension of the same or similar materials or components, to retain the existing character, structural uniqueness, heritage value, or aesthetic appearance of all or part of the *building* if, the *construction* will not adversely affect the early warning and evacuation systems, fire separations, the structural adequacy or create an unhealthy environment in the *building*.

(2) *Construction* in respect of a *hotel* may only be carried out in accordance with Sentence (1) provided that the *construction* will be in conformance with Part 9 of Division B of the Fire Code made under the *Fire Protection and Prevention Act, 1997*.

11.3.3.2. Extensive Renovation

(1) Where existing interior walls or ceilings or floor assemblies or roof assemblies are substantially removed in an existing *building* and new interior walls, ceilings, or floor assemblies are installed in the *building*, structural and fire-resistance elements shall be constructed in compliance with the requirements of the other Parts.

(2) Except as provided in Section 11.5., the proposed *construction* within an existing *suite* shall comply with the requirements of Section 3.8. where,

(a) the existing interior walls or floor assemblies within the *suite* are substantially removed in an existing *building*,

(b) new interior walls or floor assemblies are installed,

(c) the *suite* has an area greater than 300 m^2, and

(d) the *suite* is located on,

  (i) a *floor area* where the existing difference in elevation between the adjacent ground level and the floor level is not more than 200 mm., or

  (ii) a normally occupied *floor area* which is accessible by a passenger type elevator or other platform equipped passenger elevating device from an entrance *storey* where the existing difference in elevation between the adjacent ground level and the entrance *storey* level is not more than 200 mm.

11.3.4. Plumbing

11.3.4.1. Extension, Material Alteration or Repair

(1) Notwithstanding Subsections 11.3.1. to 11.3.3., when an existing *building* is extended or subject to material alteration or repair, Part 7 applies,

(a) to the design and *construction* of *plumbing* in the extensions and those parts of the *building* subject to material alteration and repair, and

(b) to *plumbing* which is adversely affected by the extension, alteration or repair.

11.3.5. Sewage Systems

11.3.5.1. Existing Septic Tanks

(1) Notwithstanding Subsections 11.3.1. to 11.3.3., where an existing *septic tank* is subject to material alteration, repair or replacement, the *construction* of the *septic tank* shall comply with Part 8.

Section 11.4. Performance Level Evaluation and Compensating Construction

11.4.1. General

11.4.1.1. Performance Level

(1) The *performance level* of a *building* after *construction* shall not be less than the *performance level* of the *building* prior to *construction*.

(2) For the purposes of Sentence (1), reduction of *performance level* shall be determined in accordance with Subsection 11.4.2.

(3) Where the proposed *construction* would reduce the *performance level* of an existing *building*, compensating *construction* shall be required in conformance with Subsection 11.4.3.

11.4.2. Reduction in Performance Level

11.4.2.1. Structural

(1) The *performance level* of an existing *building* is reduced where after proposed *construction* in all or part of an existing *building*,

(a) the *major occupancy* will change to a different *major occupancy*,

(b) the *occupant load* will increase by more than 15%, or

(c) the *live load* will increase due to change in use within the same *major occupancy*,

and the existing structural floor and roof framing systems and their supporting members after the *construction* are not adequate to support the proposed *dead loads* and *live loads*.

11.4.2.2. Increase in Occupant Load

(1) Except as required in Sentences 11.4.2.5.(2) and (3), the *performance level* of an existing *building* is reduced where proposed *construction* will increase the *occupant load* of an existing *building* by more than 15%.

(2) The *performance level* of an existing *building* is reduced where proposed *construction* will increase the *occupant load* by 15% or less and the new *occupant load* will be more than 15% above the *occupant load* for which a fire alarm system is required under Sentence 3.2.4.1.(2).

(3) The *performance level* of an existing *building* is reduced where proposed *construction* will increase the *occupant load* by 15% or less and the new *occupant load* will be more than 15% above the existing exit capacity as required under Article 3.4.3.4.

11.4.2.3. Change of Major Occupancy

(1) Except as required in Sentence 11.4.2.5.(4), the *performance level* of an existing *building* is reduced where proposed *construction* will result in,

(a) the change of the *major occupancy* of all or part of an existing *building* to another *major occupancy* of a greater *hazard index*,

(b) the conversion of a *suite* of a Group C *major occupancy* into more than one *suite* of Group C *major occupancy*,

(c) a *suite* or part of a *suite* of a Group A, Division 2 or a Group A, Division 4 *major occupancy* is converted to a *gaming premises*,

(d) the change of a *farm building* or part of a *farm building* to a *major occupancy*,

(e) the change of a *building* or part of a *building* is to a *post-disaster building*, or

(f) the change in use of a *building* or part of a *building* where the previous *major occupancy* of the *building* or part of the *building* cannot be determined.

(2) For the purpose of this Article and Sentences 11.4.2.1.(1) and 11.4.2.5.(4), the change of use set out in Clauses (1)(b) to (e) shall also be deemed to constitute a change in *major occupancy*.

(3) The *performance level* of an existing *building* is reduced where the early warning and evacuation systems requirements of other Parts for the proposed *major occupancy* exceed those of the existing *building*.

(4) The *performance level* of an existing *building* is reduced where the proposed *major occupancy* in the *building* is not separated from the adjoining *major occupancies* by *fire separations* having *fire-resistance ratings* conforming to Tables 3.1.3.1. and 11.4.3.4.B.

(5) The *performance level* of an existing *building* is reduced where the *occupancy* of all or part of an existing *building* of *combustible construction* is changed to a new *major occupancy* that would require the *building*, if it were a new *building*, to be *constructed* of *noncombustible construction*.

11.4.2.4. Plumbing

(1) The *performance level* of an existing *building* is reduced where the existing *building* is extended or subject to material alteration or repair, and *plumbing* in the existing *building* is adversely affected by the extension, alteration or repair.

11.4.2.5. Sewage Systems

(1) The *performance level* of an existing *building* is reduced where the existing *building* is extended or subject to material alteration or repair and a *sewage system* serving the existing *building* is adversely affected by the extension, alteration or repair of the existing *building*.

(2) Except as provided in Sentence (3), the *performance level* of an existing *building* is reduced where proposed *construction* will increase the *occupant load* of an existing *building*, and the new *occupant load* will result in the total daily design *sanitary sewage flow* of the *building*, calculated in accordance with Article 8.2.1.3., exceeding the capacity of any component of a *sewage system* serving the *building*.

(3) The *performance level* of an existing *dwelling unit* is reduced where *proposed construction* that,

(a) increases the number of bedrooms in the *dwelling unit*,

(b) exceeds 15% of the finished area of the *dwelling unit*, or

(c) adds new *plumbing fixtures to the dwelling unit*,

will result in the total daily design *sanitary sewage* flow of the *dwelling unit*, calculated in accordance with Article 8.2.1.3., exceeding the capacity of any component of a *sewage system* serving the *dwelling unit*.

(4) The *performance level* of an existing *building* is reduced where proposed *construction* will result in the change of a *major occupancy* of all or part of the existing *building* to another *major occupancy* and,

(a) the total daily design *sanitary sewage flow* of the proposed *major occupancy*, calculated in accordance with Article 8.2.1.3., exceeds the capacity of any component of a *sewage system* serving the *building*, or

(b) the type or amount of *sanitary sewage* which will, under the proposed *major occupancy*, be discharged to a *sewage system* serving the *building*, is prohibited by Article 8.1.3.1.

11.4.3. Compensating Construction

11.4.3.1. General

(1) Where the *performance level* of an existing *building* is reduced under Subsection 11.4.2., compensating *construction* shall be carried out in accordance with this Subsection.

(2) Except as provided in Sentence (3) compensating *construction* required under this Subsection applies to the part of the *building* being altered and shall include,

(a) *fire separations*, with the required *fire-resistance ratings*, separating the part being altered from the *floor areas* immediately above and below and from the immediate adjacent areas, and

(b) *access to exits* and *exits* from the *building*, where the alteration adversely affects the *exit* system of the *building*.

(3) Compensating *construction* required under this Subsection applies to the existing *building systems* that are adversely affected by the proposed *construction*.

11.4.3.2. Structural

(1) Where the *performance level* of an existing *building* is reduced under Sentence 11.4.2.1.(1),

(a) remedial measures shall be taken to support the proposed loads, or

(b) the portion of the floor affected by the proposed loads shall be restricted to the loading it will support and signs stating the restrictions shall be posted.

11.4.3.3. Increase in Occupant Load

(1) Where the *performance level* of an existing *building* is reduced under Sentences 11.4.2.2.(1), (2) or (3) the *building* shall be evaluated, and the early warning and evacuation systems shall be upgraded, in conformance with the applicable requirements of Table 11.4.3.3.

(2) Sentence (1) does not apply in a Group C *occupancy* where the new total *occupant load* is,

(a) 14 persons or fewer in a *boarding, lodging or rooming house*, except that where the *occupant load* is between 10 and 15 persons, an interconnected system of *smoke alarms* in corridors near stairways is required, or

(b) 16 persons or fewer in a *building* containing residential *suites* which are *dwelling units*, except that where the *occupant load* is between 10 and 17 persons, an interconnected system of *smoke alarms* in corridors near stairways is required.

(3) Where the *performance level* of an existing *building* is reduced under Sentence 11.4.2.2.(1), additional *construction* shall be required in order that the *building* or part of the *building* subject to the increase in *occupant load* conforms to the requirements of Sentence 6.2.2.1.(2), Subsection 3.7.4. and Article 9.31.1.1.

11.4.3.4. Change in Major Occupancy

(1) Where the *performance level* of an existing *building* is reduced under Sentence 11.4.2.3.(1), additional upgrading shall be required in conformance with Table 11.4.3.4.A. and so that the *construction index* of the *building* is increased to at least equal the *hazard index* of the new *major occupancy* that the *building* is to support.

(2) A *building* or part of the *building* subject to change of *major occupancy* shall conform to the requirements of Subsection 3.2.6., Sections 3.7., 3.11., 3.12., Sentences 6.2.2.1.(2), 6.2.3.9.(1) and 6.2.4.7.(10), Articles 9.5.1.1. to 9.5.1.5, Articles 9.5.3.1. to 9.5.10.1, Section 9.7., Subsection 9.10.17., Sections 9.31. and 9.32., and Subsections 9.34.1. to 9.34.3. as they apply to the new *major occupancy* that the *building* or part of the *building* is to support.

(3) Where the *performance level* of an existing *building* is reduced under Sentence 11.4.2.3.(3), the *building* shall be evaluated, and the early warning and evacuation systems shall be upgraded, in conformance with the applicable requirements of Table 11.4.3.3.

(4) Where the *performance level* of an existing *building* is reduced under Sentence 11.4.2.3.(4), upgrading of those systems shall be required in conformance with the applicable requirements of Article 3.1.3.1. and Table 11.4.3.4.B.

(5) Where the *performance level* is reduced under Sentence 11.4.2.3.(5) the requirement for *noncombustible construction* is satisfied if the *building* is *sprinklered*.

11.4.3.5. Plumbing

(1) Where the *performance level* of an existing *building* is reduced under Sentence 11.4.2.4.(1), upgrading of *plumbing* in the existing *building* which is adversely affected by the extension, alteration or repair shall be required in conformance with Part 7.

11.4.3.6. Sewage Systems

(1) Where the *performance level* of an existing *building* is reduced under Article 11.4.2.5., upgrading of a *sewage system* which is adversely affected by the *construction*, increase in *occupant load*, increase in the total daily design *sanitary sewage* flow or change in amount or type of *sanitary sewage* shall be required in conformance with Part 8.

Section 11.5. Compliance Alternatives

11.5.1. Compliance Alternatives

11.5.1.1. Compliance Alternatives

(1) A *compliance alternative* shown in Tables 11.5.1.1.A., 11.5.1.1.B., 11.5.1.1.C., 11.5.1.1.D/E. or 11.5.1.1.F. may be substituted for a requirement contained in Part 3, 4, 5, 6, 7 or 8 where the *chief building official* is satisfied that compliance with the requirement is impracticable because,

(a) of structural or *construction* difficulties, or

(b) it is detrimental to the preservation of a *heritage building*.

(2) A *compliance alternative* shown in Tables 11.5.1.1.A., 11.5.1.1.B., 11.5.1.1.C., 11.5.1.1.D/E. or 11.5.1.1.F. may be substituted for a requirement contained in Part 9 without satisfying the *chief building official* that compliance with the requirement is impracticable.

Table 11.2.1.1.A.
Construction Index

Forming Part of Sentence 11.2.1.1.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5
Fire-Resistance Rating			Type of *Construction*	C.I.(2)
Floors over *Basement*	Other Floors	Roof		
3 h	3 h	1.5 h	*Noncombustible*	8(1)
2 h	2 h	1 h	*Noncombustible*	7
1 h	1 h	45 min	*Noncombustible*	6
45 min	45 min	0 h	*Noncombustible*	5
45 min	45 min	45 min	*Heavy Timber*	5
45 min	45 min	45 min	*Combustible*	5
45 min	0 h	0 h	*Noncombustible*	4
45 min	45 min	0 h	*Combustible*	4
30 min	0 h	0 h	*Noncombustible*	3
30 min	30 min	0 h	*Combustible*	3
0 h	30 min	0 h	*Combustible*	2
0 h	0 h	0 h	*Combustible*	1(1)

Notes to Table 11.2.1.1.A.:

(1) C.I. of 1 is lowest fire protection *performance level* and C.I. of 8 is highest.

(2) Take highest rating for C.I. from Table 11.2.1.1.A. for existing *building*.

Table 11.2.1.1.B.
Hazard Index

Forming Part of Sentences 11.2.1.1.(1) and (2)

(1)

(2)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
Group A	Occupancy H.I.(5)		
Division 1	Small	Medium	Large
Dinner Theatres	4	5	6
Live Theatres	4	5	6
Motion Picture Theatres	4	5	6
Opera Houses	4	5	6
Television Studios (With Audience)	4	5	6

Notes to Table 11.2.1.1.B.:

(1)

Building Size (Maximum) (2&3)	
- 300 *occupant load* maximum / 1 *storey*	Small
- 600 m^2 / 600 *occupant load* maximum / 1 *storey* with less than 40% 2 *storey* (6)	Medium
- Any area / not exceeding 18 m in *building height*	Large
- Over 18 m in *building height*	H.I. = 7

(2) Sizes are based on *building area* and *building height.*

(3) *Building* size is based on the existing *building* facing one *street.*

(4) For existing *buildings* facing multiple *streets* see Sentence 11.2.1.1.(2) and Table 11.4.3.4.A.

(5) Take lowest rating for H.I. from Table for *major occupancy* change.

(6) *Building* may have less than 40% of its area as 2 *storey* for purposes as described in Clauses 3.2.2.21.(1)(b) and (c).

Table 11.2.1.1.C.
Hazard Index
Forming Part of Sentences 11.2.1.1.(1) and (2)

(1)

(2)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
Group A	Occupancy H.I.(5)		
Division 2	Small	Medium	Large
Art Galleries	3	4	6
Auditoria	3	4	6
Billiard Halls, Amusement Arcades	3	4	6
Bowling Alleys	3	4	6
Churches	3	4	6
Clubs, Lodges (Non-Residential)	3	4	6
Community Halls	3	4	6
Concert Halls	3	4	6
Court Rooms	3	4	6
Dance Halls	3	4	6
Daycare Centres	3	4	6
Exhibition Halls (Without Sales)	3	4	6
Exhibition Halls (With Sales)	See Group E		
Gaming premises	3	4	6
Gymnasia (Multi-Purpose)	3	4	6
Gymnasia (Athletic)	3	4	6
Lecture Halls	3	4	6
Libraries	3	4	6
Licensed Beverage Establishments	3	4	6
Licensed Clubs, Lodges	3	4	6
Museums	3	4	6
Passenger Stations / Depots	3	4	6
Public Heritage Buildings	3		
Recreational Piers	3	4	6
Restaurants	3	4	6
Schools, Colleges	3	4	6
Undertaking Premises	3	4	6

Notes to Table 11.2.1.1.C.:

(1)

Building Size (Maximum) (2)(3)	
- 400 m^2 / 1 *storey*	Small
- 250 m^2 / 3 *storey* (*Public Heritage Building*)	Small
- 800 m^2 / 2 *storey*	Medium
- Any area / not exceeding 18 m in *building height*	Large
- Over 18 m in *building height*	H.I. = 7

(2) Sizes are based on *building area* and *building height*.

(3) *Building* size is based on the existing *building* facing one *street*.

(4) For existing *buildings* facing multiple *streets* see Sentence 11.2.1.1.(2) and Table 11.4.3.4.A.

(5) Take lowest rating for H.I. from Table for *major occupancy* change.

(6) *Building* exceeding 3 *storeys* in *building height* and which are *combustible* shall be *sprinklered*..

Table 11.2.1.1.D.
Hazard Index

Forming Part of Sentences 11.2.1.1.(1) and (2)

(1)

(2)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
Group A	Occupancy H.I.[5]		
Division 3	Small	Medium	Large
Arenas (No Occupancy On Activity Surface)	3	4	6
Armouries (No Occupancy On Activity Surface)	3	4	6
Enclosed Stadia or Grandstand	3	4	6
Ice Rinks (No Occupancy On Activity Surface)	3	4	6
Indoor Swimming Pools	3	4	6

Notes to Table 11.2.1.1.D.:

(1)

Building Size (Maximum)[2][3]	
- 1000 m^2 / 1 *storey*	Small
- 2000 m^2 / 2 *storey*	Medium
- Any area / not exceeding 18 m in *building height*	Large
- Over 18 m in *building height*	H.I. = 7

[2] Sizes are based on *building area* and *building height.*

[3] *Building* size is based on the existing *building* facing one *street.*

[4] For existing *buildings* facing multiple *streets* see Sentence 11.2.1.1.(2) and Table 11.4.3.4.A.

[5] Take lowest rating for H.I. from Table for *major occupancy* change.

Table 11.2.1.1.E.
Hazard Index

Forming Part of Sentences 11.2.1.1.(1) and (2)

(1)

(2)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
Group A	Occupancy H.I.[5]		
Division 4	Small	Medium	Large
Amusement Park Structures	2	3	5
Bleachers	1	3	5
Grandstands (Open)	1	3	5
Reviewing Stands	1	3	5
Stadia (Open)	1	3	5

Notes to Table 11.2.1.1.E.:

(1)

Building Size (Maximum)[2][3]	
- 2,500 *occupant load* max./min. *limiting distance* of 6 m (*combustible*)	Small
- 15,000 *occupant load* maximum (with roof at least ½ rating if *combustible*)	Medium
- Unlimited *occupant load*	Large

[2] Sizes are based on *building area* and *building height.*

[3] *Building* size is based on the existing *building* facing one *street.*

[4] For existing *buildings* facing multiple *streets* see Sentence 11.2.1.1.(2) and Table 11.4.3.4.A.

[5] Take lowest rating for H.I. from Table for *major occupancy* change.

Table 11.2.1.1.F.
Hazard Index

Forming Part of Sentences 11.2.1.1.(1) and (2)

(1)

(2)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
Group B	Occupancy H.I.(3)(5)		
Division 1	Small	Medium	Large
Detention Facilities (Minimum Security)(4)	4	5	6
Detention Facilities (All Other Types of Security)	6	6	7
Police Station with Detention	3		

Notes to Table 11.2.1.1.F.:

(1)

Building Size (Maximum)(2)	
- Any area / 1 *storey*	Small
- 600 m^2 / 1 *storey* (Police Station with Detention)	Small
- Any area (*noncombustible*) / 2 *storey*	Medium
- Any area (*noncombustible*); 500 m^2 (*combustible*) / 2 *storey*	Large
- Over 18 m in *building height* (*noncombustible*)	H.I. = 7
- Over 500 m^2 (*combustible*) / over 2 *storey*	H.I. = 7

(2) Sizes are based on *building area* and *building height.*

(3) When the size of a *building* falls into more than one category, the H.I. for the least restrictive is permitted to be used.

(4) Minimum security - means occupants free to exit *building* in a fire emergency.

(5) *Detention occupancy* with any H.I. shall be *sprinklered.*

Table 11.2.1.1.G.
Hazard Index

Forming Part of Sentences 11.2.1.1.(1) and (2)

(1)

(2)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
Group B	Occupancy H.I.(5)(7)		
Division 2	Small	Medium	Large
Hospital, Nursing Home, Geriatric, Sanitorium (6) (Immobile)	4	5	7
Hospital, Nursing Home, Geriatric, Sanitorium (6) (Non-Ambulatory)	4	5	6
Hospital, Nursing Home, Geriatric, Sanitorium (6) (Ambulatory)	3	4	6
Psychiatric Hospitals (Maximum Confinement)	4	5	7
Psychiatric Hospitals (Minimum Confinement)	3	4	6
Police Station With Detention	3		

Notes to Table 11.2.1.1.G.:

(1)

Building Size (Maximum)(2)(3)	
- 250 m^2 / 1 *storey*	Small
- 600 m^2 / 1 *storey* (Police Station with Detention)	Small
- 500 m^2 / 2 *storey*; 1000 m^2 / 1 *storey*	Medium
- Any area (*noncombustible*); 500 m^2 (*combustible*) / 2 *storey*	Medium
- Any area / not exceeding 18 m in *building height*	Large
- Over 18 m in *building height*	H.I. = 7

(2) Sizes are based on *building area* and *building height.*

(3) *Building* size is based on the existing *building* facing one *street.*

(4) For existing *buildings* facing multiple *streets* see Sentence 11.2.1.1.(2) and Table 11.4.3.4.A.

(5) When the *size* of a *building* falls into more than one category, the H.I. for the least restrictive is permitted to be used.

(6) Immobile-means patients attached to life support systems and cannot be moved. Non-Ambulatory-means patients confined to bed and require transportation. Ambulatory-means patients may walk on their own.

(7) *Care and treatment occupancy* with any H.I. shall be *sprinklered.*

Table 11.2.1.1.H.
Hazard Index

Forming Part of Sentences 11.2.1.1.(1) and (2)

(1)

(2)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
Group B	Occupancy H.I.(4)(5)		
Division 3	Small	Medium	Large
Residential care facilities			
(Ambulatory)	3	4	6
(Non-Ambulatory)	4	5	6
Children Custodial Homes	3	4	6
Convalescent Homes			
(Ambulatory)	3	4	6
(Non-Ambulatory)	4	5	6
Orphanages	3	4	6
Sanatoria Without Detention Quarter			
(Min. Confinement)	3	4	6
(Max. Confinement)	4	5	6
Group Homes For Developmentally Handicapped Residents			
(Min. Confinement)	3	4	6
(Max. Confinement)	4	5	6

Notes to Table 11.2.1.1.H.:

(1)

Building Size (Maximum)(2)(3)	
- 600 m^2 / 1 *storey*	Small
- 500 m^2 / 2 *storey*; 1000 m^2 / 1 *storey*	Medium
- Any area / not exceeding 18 m in *building height*	Large
- Over 18 m in *building height*	H.I. = 7

(2) Sizes are based on *building area* and *building height*

(3) *Building* sizes is based on the existing *building* facing one *street*

(4) When the size of a *building* falls into more than one category, the H.I. for the least restrictive is permitted to be used.

(5) *Care occupancy* with any H.I. shall be *sprinklered.*

Table 11.2.1.1.I.
Hazard Index

Forming Part of Sentences 11.2.1.1.(1) and (2)

(1)

(2)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
Group C	Occupancy H.I.(4)		
	Small	Medium	Large
Apartments	3	4	6
Boarding Houses/Group Homes	3		
Clubs, Residential	3	4	6
Colleges, Residential	3	4	6
Convents	3	4	6
Dormitories/Hostels	3	4	6
Hotels	3	5	6
Houses	2	2	
Lodging Houses	3		
Live/work units	4	5	7
Monasteries	3	4	6

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
Group C	Occupancy H.I.[4]		
	Small	Medium	Large
Public Heritage Buildings	3		
Rectories	2		
Retirement Homes	3	4	6
Rooming Houses	3		
Schools, Residential	3	4	6

Notes to Table 11.2.1.1.I.:

(1)

Building Size (Maximum) [2][3]	
- 600 m^2 / 3 *storey*	Small
- 250 m^2 / 3 *storey* (*Public Heritage Building*)	Small
- 2000 m^2 / not exceeding 6 *storeys*	Medium
- Any area / not exceeding 36 m in *building height*	Large
- Over 36 m in *building height*	H.I. = 7
- *Hotels* over 18 m high, measured between *grade* and the floor level of the top *storey*	H.I. = 7

(2) Sizes are based on *building area* and *building height*.

(3) *Building* exceeding 3 *storeys* in *building height* and which are *combustible* shall be *sprinklered*.

(4) Take lowest rating for H.I. from Table for *major occupancy* change.

Table 11.2.1.1.J.
Hazard Index

Forming Part of Sentences 11.2.1.1.(1) and (2)

(1)

(2)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
Group D	Occupancy H.I.[5]		
	Small	Medium	Large
Advertising and Sales Offices	3	3	5
Automatic Bank Deposit	3	4	5
Barber/Hairdresser Shops	3	4	5
Beauty Parlours	3	4	5
Branch Banks	3	4	5
Car Rental Premises	3	3	5
Chiropractic Offices	3	4	5
Communications Offices (Telephone)	3	4	5
Communications Offices (Telex)	3	4	5
Communications Offices (Courier)	3	3	5
Computer Centres	3	4	5
Construction Offices	3	3	5
Costume Rental Premises	3	4	5
Dental Offices (Denture Clinic)	3	4	5
Dental Offices (General)	3	4	5
Dental Offices (Surgical/Anaesthesia)	4	5	6
Dry Cleaning Depots	3	4	5
Dry Cleaning Premises (Self-Serve)	4	4	5
Health/Fitness Clubs	3	4	5
Laundries (Self-Serve)	4	4	5
Massage Parlours	3	4	5
Medical Offices (Examination)	3	4	5
Medical Offices (Surgical/Anaesthesia)	4	5	6
Offices (Business)	3	3	5
Offices (Charitable)	3	3	5
Offices (Legal/Accounting)	3	3	5
Offices/Studios (Design)	3	4	5
Pharmacy Offices	3	4	5
Photographic Studios	3	4	5
Physiotherapy Offices	3	4	5
Police Stations (No Detention)	3	4	5

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
Group D	Occupancy H.I.(5)		
	Small	Medium	Large
Printing and Duplicating	4	5	6
Public Heritage Buildings	3		
Public Saunas	3	4	5
Radio Stations (No Audience)	3	4	5
Small Tool Rental Premises	3	4	5
Suntan Parlours	3	4	5
Veterinary Offices	3	4	5

Notes to Table 11.2.1.1.J.:

(1)

Building Size (Maximum) (2)(3)	
- 800 m^2 / 2 *storey*	Small
- 250 m^2 / 3 *storey* (*Public Heritage Building*)	Small
- 1600 m^2 / 3 *storey*	Medium
- Any area / not exceeding 18 m in *building height*	Large
- Over 18 m, but not exceeding 36 m in *building height*	H.I. = 6
- Over 36 m in *building height*	H.I. = 7

(2) Sizes are based on *building area* and *building height*.

(3) *Building* size is based on the existing *building* facing one *street*.

(4) For existing *buildings* facing multiple *streets* see Sentence 11.2.1.1.(2) and Table 11.4.3.4.A.

(5) When the size of a *building* falls into more than one category, the H.I. for the least restrictive is permitted to be used.

Table 11.2.1.1.K.
Hazard Index

Forming Part of Sentences 11.2.1.1.(1) and (2)

(1)

(2)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
Group E	Occupancy H.I.(5)		
	Small	Medium	Large
Automotive/Hardware Department Stores	4	5	7
China Shops	3	4	6
Department Stores	4	5	7
Electrical Stores (Fixtures)	3	3	5
Exhibition Halls (With Sales)	4	5	7
"Fast Food" Outlets	3	4	5
Feed and Seed Stores	4	5	7
Flea Markets	4	5	7
Flowers Shops	3	4	6
"Food" and Vegetable Markets	3	4	6
Garden Shops	3	4	6
"Gas" Bars	4	5	7
Gift Shops	3	4	6
Home Improvement Stores	4	5	7
Kitchen/Bathroom Cupboards Stores	3	4	6
Plumbing Stores (Fixtures/Accessories)	3	3	5
"Pop" Shops	3	4	6
Public Heritage Buildings	3		
Rentals (See "Group D")			
Restaurants (Not More Than 30 Persons)	3	4	5
Shopping Malls	4	5	7
Stationery/Office Supply Stores	3	4	6
Stores (Art)	3	4	6
Stores (Baked Goods)	3	4	6
Stores (Beer)	3	4	6
Stores (Book)	3	4	6
Stores (Camera)	3	4	6

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
Group E	Occupancy H.I.[5]		
	Small	Medium	Large
Stores (Candy)	3	4	6
Stores (Clothing)	3	4	6
Stores (Drugs)	4	4	6
Stores (Electronic)	3	4	6
Stores (Floor Coverings)	4	5	7
Stores (Food)	3	3	6
Stores (Furniture/Appliances)	3	4	6
Stores (Hardware)	4	5	7
Stores (Health)	4	4	6
Stores (Hobby)	3	4	6
Stores (Jewellery)	3	3	5
Stores (Paint/Wallpaper)	4	5	7
Stores (Pet)	3	4	6
Stores (Records/Tapes)	3	4	6
Stores (Spirits)	4	5	7
Stores (Toys)	4	5	7
Stores (Variety)	4	4	6
Stores (Video Sales/Rental)	3	4	6
Supermarkets	3	4	6

Notes to Table 11.2.1.1.K.:

(1)

Building Size (Maximum) [2][3]	
- 600 m^2 / 2 *storey*	Small
- 250 m^2 / 3 *storey* (*Public Heritage Building*)	Small
- 800 m^2 / 3 *storey*	Medium
- Any area / up to 18 m in *building height*	Large
- Over 18 m in *building height*	H.I. = 7

(2) Sizes are based on *building area* and *building height*.

(3) *Building* size is based on the existing *building* facing one *street*.

(4) For existing *buildings* facing multiple *streets* see Sentence 11.2.1.1.(2) and Table 11.4.3.4.A.

(5) When the size of a *building* falls into more than one category, the H.I. for the least restrictive is permitted to be used.

(6) All *buildings* 1500 m^2 and over are to be *sprinklered*.

Table 11.2.1.1.L.
Hazard Index

Forming Part of Sentences 11.2.1.1.(1) and (2)

(1)

(2)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
Group F	Occupancy H.I.[3]		
Division 1	Small	Medium	Large
Ammunition Manufacturing and Storage	3	6	8
Black Powder Manufacturing and Storage	3	6	8
Bulk Plants for Flammable Liquids	3	6	8
Bulk Storage Warehouse (Hazardous Substances)	3	6	8
Cereal and Feed Mills	3	6	8
Chemical Manufacturing/Processing Plant	3	6	8
Distilleries	3	6	8
Dry Cleaning Plants (Flammable)	3	6	8
Explosives Manufacturing and Storage	3	6	8
Fertilizer Manufacturing Plants	3	6	8
Fireworks Manufacturing and Storage	3	6	8
Flour Mills	3	6	8
Gas (Flammable) Compressor Stations	3	6	8
Gas (Flammable) Manufacturing and Storage	3	6	8
Grain Elevators	3	6	8

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
Group F	Occupancy H.I.[3]		
Division 1	Small	Medium	Large
Lacquer Factories	3	6	8
Loading Area for all Group F, Division 1	3	6	8
Mattress Factories (High Fire Load)	3	6	8
Paint/Varnish/Pyroxylin Factories	3	6	8
Petrochemical Plants	3	6	8
Refineries	3	6	8
Rubber Processing Plants	3	6	8
Spray Painting Operations	3	6	8
Waste Paper Processing Plants (Dry)	3	6	8

Notes to Table 11.2.1.1.L.:

(1)

Building Size (Maximum) [2]	
- 400 m^2 / 2 *storey* - 600 m^2 / 4 *storey* - 1500 m^2 / 4 *storey*	Small Medium Large

(2) Sizes are based on *building area* and *building height*.

(3) When the size of a *building* falls into more than one category, the H.I. for the least restrictive is permitted to be used.

(4) All *buildings* 1500 m^2 and over are to be *sprinklered*.

(5) All floor assemblies shall be *fire separations*.

Table 11.2.1.1.M.
Hazard Index

Forming Part of Sentences 11.2.1.1.(1) and (2)

(1)

(2)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
Group F	Occupancy H.I.[5]		
Division 2	Small	Medium	Large
Aircraft Hangars	3	5	6
Abattoirs	3	4	5
Bakeries	3	5	6
Body Shops	3	5	6
Candy Plants	3	4	5
COLD STORAGE PLANTS *Combustible* Insulation Flammable Refrigerant *Combustible* Packaging	3	5	7
Combustible Insulation Flammable Refrigerant *Noncombustible* Packaging	3	5	6
Combustible Insulation Non-Flammable Refrigerant *Noncombustible* Packaging	3	4	5
Noncombustible Insulation Non-Flammable Refrigerant *Noncombustible* Packaging	2	3	4
Dry Cleaning Establishments (Non-flammable or Non-explosive)	3	4	5
Electrical Substations	3	4	5
Factories (High Fire Load)	3	5	6
Freight Depots (High Fire Load)	3	5	6
Helicopter Landings (On Roof)	3	4	5
Laboratories (High Fire Load)	3	5	6
Laundries (Not Self-Serve)	3	4	5
Manufacturer Sales (High Fire Load)	3	5	6
Mattress Factories	3	4	5
Meat Packing Plants	3	4	5

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
Group F	Occupancy H.I.(5)		
Division 2	Small	Medium	Large
Packaging Manufacturers (Cellulose)	3	4	5
Packaging Manufacturers (Noncombustible)	2	3	4
Packaging Manufacturers (Plastics)	3	5	6
Paper Processing Plants (Wet)	3	5	6
Plaining Mills	3	5	6
Printing Plants	3	4	5
Public Heritage Buildings	3	3	
Repair Garages	3	5	6
Sample Display Rooms (High Fire Load)	3	5	6
Self-Service Storage Buildings	3	4	5
Service Stations (No Spray Painting)	3	5	6
Storage Rooms (High Fire Load)	3	5	6
Television Studios (No Audience)	3	4	5
Tire Storage	3	5	6
Warehouses (High Fire Load)	3	5	6
Welding Shops	3	5	6
Wholesale Rooms (High Fire Load)	3	5	6
Wood Working Factories	3	5	6
Workshops (High Fire Load)	3	5	6

Notes to Table 11.2.1.1.M.:

(1)

Building Size (Maximum) (2)(3)	
- 600 m^2 / 2 *storey*	Small
- 800 m^2 /4 *storey*	Medium
- 600 m^2 / 3 *storey* (*Public Heritage Building*)	Medium
- Any area / 6 *storey* not exceeding 18 m in *building height*	Large
- Over 18 m in *building height*	H.I. = 7

(2) Sizes are based on *building area* and *building height*.

(3) *Building* size is based on the existing *building* facing one *street*.

(4) For existing *buildings* facing multiple *streets* see Sentence 11.2.1.1.(2) and Table 11.4.3.4.A.

(5) When the size of a *building* falls into more than one category, the H.I. for the least restrictive is permitted to be used.

(6) All *buildings* 1500 m^2 and over are to be *sprinklered*.

Table 11.2.1.1.N.
Hazard Index

Forming Part of Sentences 11.2.1.1.(1) and (2)

(1)

(2)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
Group F	Occupancy H.I.(5)		
Division 3	Small	Medium	Large
Creameries	2	2	3
Factories (Low Fire Load)	2	3	4
Freight Depots (Low Fire Load)	2	3	4
Laboratories (Low Fire Load)	2	3	4
Manufacturers Sales (Low Fire Load)	2	3	4
Power Plants	3	4	5
Public Heritage Buildings	3	3	
Sample Display Rooms (Low Fire Load)	2	3	4
Storage Garages	2	3	4
Storage Rooms (Low Fire Load)	2	3	4
Warehouses (Low Fire Load)	2	3	4
Wholesale Rooms (Low Fire Load)	2	3	4
Workshops (Low Fire Load)	2	3	4

Notes to Table 11.2.1.1.N.:

(1)

Building Size (Maximum) (2)(3)	
- 800 m^2 / 2 *storey*	Small
- 1200 m^2 / 4 *storey*	Medium
- 600 m^2 / 3 *storey* (*Public Heritage Building*)	Medium
- Any area / 6 *storey* not exceeding 18 m in *building height*	Large
- Over 18 m, but not exceeding 36 m in *building height*	H.I. = 5
- Over 36 m in *building height*	H.I. = 6

(2) Sizes are based on *building area* and *building height*.

(3) *Building* size is based on the existing *building* facing one *street*.

(4) For existing *buildings* facing multiple *streets* see Sentence 11.2.1.1.(2) and Table 11.4.3.4.A.

(5) When the size of a *building* falls into more than one category, the H.I. for the least restrictive is permitted to be used.

Table 11.4.3.3.
For Evaluation and Upgrading of Early Warning/Evacuation

Forming Part of Sentences 11.4.3.3.(1) and (2)

COL. 1	COLUMN 2	COLUMN 3
Notes	Early Warning and Evacuation, Evaluation and Upgrading	Part 11 Compliance Alternative (1)
(2)	Early Warning and Evacuation to be checked against (a) *access to exit* widths based on *occupant load* in Subsection 3.3.1. or 9.9.3.; (b) *exit* widths based on *occupant load* in Subsection 3.4.3. or 9.9.3.; (c) *exit* signs in Subsection 3.4.5. or 9.9.10; (d) lighting of *exits*, lighting of *access to exits* and emergency lighting in Subsection in Subsection 3.2.7. or 9.9.11.; (e) fire alarm system in Subsection 3.2.4. or 9.10.18.; (f) *smoke alarms* in Subsection 9.10.19.; (g) travel distance and number of *exits* in other Parts; and (h) door release hardware requirements in Articles 3.3.1.12. and 3.4.6.15., and deficiencies shall be upgraded.	EARLY WARNING (a) *Compliance alternatives* as listed may be used. EVACUATION (b) *Compliance alternatives* as listed to *access to exit* and *exit* widths, number of *exits*, door release hardware, and travel distance may be used.
(3)	Early Warning and Evacuation to be checked against (a) *access to exit* widths based on *occupant load* in Subsection 3.3.1. or 9.9.3.; (b) *exit* widths based on *occupant load* in Subsection 3.4.3. or 9.9.3.; (c) *exit* signs in Subsection 3.4.5. or 9.9.10; (d) lighting of *exits*, lighting of *access to exits* and emergency lighting in Subsection in Subsection 3.2.7. or 9.9.11.; (e) fire alarm system in Subsection 3.2.4. or 9.10.18.; (f) *smoke alarms* in Subsection 9.10.19.; (g) travel distance and number of *exits* in other Parts; (h) smoke control measures, and at least one elevator to permit transport of fire fighters to all floors in hotels whose floor level is more than 18 m high measured between *grade* and floor level of the top *storey* as per Subsection 3.2.6., and (i) door release hardware requirements in Articles 3.3.1.12. and 3.4.6.15., and deficiencies shall be upgraded.	EARLY WARNING (a) *Compliance alternatives* as listed may be used. EVACUATION (b) *Compliance alternatives* as listed to *access to exit* and *exit* widths, number of *exits*, door release hardware, and travel distance may be used.

Notes to Table 11.4.3.3.:

(1) See Table 11.5.1.1.A., 11.5.1.1.B., 11.5.1.1.C., 11.5.1.1.D/E. and 11.5.1.1.F. for *compliance alternatives* that may be used.

(2) Applies to change of *major occupancy* to one of equal or lesser hazard, and to increase in *occupant load* by 15% or less.

(3) Applies to change of *major occupancy* to one of greater hazard, and to increase in *occupant load* greater than 15%.

Table 11.4.3.4.A.
Additional Upgrading

Forming Part of Sentence 11.4.3.4.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5
New *Major Occupancy* (H.I.) Number [3]	Increase of C.I. to Equal H.I. to Support New *Major Occupancy*	Additional Required Upgrading	Part 11 Alternative Compliance	Comments
H.I.2	C.I. 1 to 2	Comply with Table 11.2.1.1.A. ratings for C.I. of 2	(a) Provide Early Warning system or (b) Comply with any A.C.'s in Col. 4.	
H.I.3	C.I. (1 or 2) to 3	Comply with Table 11.2.1.1.A. ratings for C.I. of 3	(a) Provide Early Warning system or (b) Comply with any A.C.'s in Col. 4.	*Combustible* to *Combustible* only.
H.I.4	C.I. (1, 2 or 3) to 4	Comply with Table 11.2.1.1.A. ratings for C.I. of 4	Provide sprinklers in locations where assemblies do not comply with Table 11.2.1.1.A.	*Combustible* to *Combustible*. *Noncombustible* to *Noncombustible*.
H.I.5	C.I. 4 to 5	Comply with Table 11.2.1.1.A. ratings for C.I. of 5	Provide sprinklers in locations where assemblies do not comply with Table 11.2.1.1.A.	
H.I.5	C.I. (1, 2 or 3) to 5	Comply with Table 11.2.1.1.A. ratings for C.I. of 5	Provide sprinklers in locations where assemblies do not comply with Table 11.2.1.1.A.	*Combustible* to *Combustible*. *Noncombustible* to *Noncombustible*.
H.I.6	C.I. 5 (*Non-combustible*) to 6	Comply with Table 11.2.1.1.A. ratings for C.I. of 6	(a) Provide sprinkler system, plus 45 min roof rating.	
H.I.6	C.I. 5 (*Heavy timber*) to 6	Comply with A.C.	(b) Provide sprinkler system.	
H.I.6	C.I. 5 (*Combustible*) to 6	Comply with A.C.	(c) Provide 1 h rating plus sprinkler system.	
H.I.6	C.I. (3 or 4) to 6*	Comply with Table 11.2.1.1.A. ratings for C.I. of 6	(d) Provide sprinkler system, plus 45 min rating.	* For *Noncombustible construction* only.
H.I.6	C.I. (1, 2, 3 or 4) to 6**	Comply with A.C.	(e) Provide 1 h rating plus sprinkler system.	** For *Combustible construction* only.
H.I.7	C.I. 6 to 7	Comply with Table 11.2.1.1.A. ratings for C.I. of 7	(a) Provide sprinkler system.	
H.I.7	C.I. (3, 4 or 5) to 7*	Comply with Table 11.2.1.1.A. ratings for C.I. of 7	(b) Provide 1 h rating plus sprinkler system.	* For *Noncombustible construction* only.
H.I.8	C.I. 7 to 8	Comply with Table 11.2.1.1.A. ratings for C.I. of 8	(a) Provide sprinkler system.	
H.I.8	C.I. 6 to 8	Comply with Table 11.2.1.1.A. ratings for C.I. of 8	(b) Provide supervised sprinkler system.	
H.I.8	C.I. (3, 4 or 5) to 8*	Comply with Table 11.2.1.1.A. ratings for C.I. of 8	(d) Provide sprinkler system, plus 1 h rating.	* For *Noncombustible construction* only.

Notes to Table 11.4.3.4.A.:

[1] One asterisk (*) refers to *noncombustible construction*.

[2] Two asterisks (**) refers to *combustible construction*.

[3] Group B, *occupancy* with any H.I. shall be *sprinklered*.

Table 11.4.3.4.B.(1)
Additional Upgrading for Multiple Major Occupancies

Forming Part of Sentences 11.4.2.3.(4) and 11.4.3.4.(4)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
New *Major Occupancy*	Code Requirements	Part 11 *Compliance Alternative*	
All(2)	Table 3.1.3.1. and Subsection 9.10.9. Where:	For Existing *Building* Reduce to	If *Sprinklered* Reduce to
	1 h rating required	45 min	30 min
	2 h rating required	1.5 h	1 h
	3 h rating required	2 h	1.5 h

Notes to Table 11.4.3.4.B.:

(1) For *buildings* with multiple *major occupancies* only, where there is a change in *major occupancy*.

(2) See Section 11.4.

Table 11.5.1.1.A.
Compliance Alternatives for Assembly Occupancies

Forming Part of Article 11.5.1.1.

COL. 1	COLUMN 2	COLUMN 3
NUMBER	**PART 3 REQUIREMENTS**	**PART 11 COMPLIANCE ALTERNATIVE**
A1	3.1.4.6.	Existing *heavy timber construction* acceptable where *construction* is within 90% of member sizes listed in Part 3.
A2	3.1.5.2.; 3.1.5.3.; 3.1.5.4.; 3.1.5.6.	Existing acceptable.
A3	3.1.5.7.; 3.1.5.8.; 3.1.5.9.; 3.1.5.10.	Except for exposed foamed plastics, existing acceptable. To match existing, materials may be added from on or off site.
A4	3.1.5.15.; 3.1.5.16.; 3.1.5.17.; 3.1.5.21.; 3.1.5.23.	Existing acceptable.
A5	3.1.7.1.	*Fire-resistance ratings* may also be used where they are based on: 1. Guideline on Fire Ratings of Archaic Materials and Assemblies, HUD No. 8. 2. Fire Endurance of Protected Steel Columns and Beams, DBR Technical Paper No. 194. 3. Fire Endurance of Unit Masonry Walls, DBR Technical Paper No. 207. 4. Fire Endurance of Light-Framed and Miscellaneous Assemblies, DBR Technical Paper No. 222.
A6	3.1.7.5.(3)	Existing assemblies required to be of *noncombustible construction* may be supported by *combustible construction* having at least the same *fire-resistance rating* as that supported.
A7	3.1.8.5.(2)	(a) Existing functional and sound doors in existing *buildings* that are either hollow metal or kalamein and containing wired glass at least 6 mm thick and conforming to Sentence 3.1.8.14.(2) are permitted in lieu of doors not required to exceed 45 min, (b) all existing functional and sound hollow metal or kalamein doors which carry existing 1.5 h labels are acceptable in lieu of current 1.5 h labels and may contain wired glass panels not exceeding 0.0645 m², at least 6 mm thick and conforming to Sentence 3.1.8.14.(2), and (c) every fire door, window assembly or glass block used as a *closure* in a required *fire separation* shall be installed in conformance with good engineering practice.
A8	3.1.8.7.; 3.1.8.8.; 3.1.8.9.	*Fire dampers* or *fire stop flaps* are not required to be installed in existing ducts at penetrations of existing *fire separations*.
A9	3.1.8.10.(1)	Existing 45 mm solid core wood doors acceptable.
A10	3.1.8.11.(1)	Existing functionally operable self-closing devices acceptable.
A11	3.1.8.13.	Existing functionally operable latching devices, excluding draw bolts, are acceptable.
A12	3.1.8.14.	Existing transoms or sidelights located in required *fire separations* may be retained if wired glass at least 6 mm thick is securely fixed to a steel frame with steel stops. Operable transoms shall be fixed closed.
A13	3.1.8.15.; 3.1.8.16., 3.1.8.17.	Existing acceptable.
A14	3.1.11.	Where the concealed space is being materially altered, smoke or heat detection in that space in lieu of firestops and tied into fire alarm system is acceptable.

COL. 1	COLUMN 2	COLUMN 3
A15	3.1.13.10.	Existing acceptable.
A16	3.2.2.17.(1)(b) and (c)	Existing sprinkler systems need not comply.
A17	3.2.3.	Existing windows. (a) Existing windows in walls may be relocated to another part of the wall, provided the existing opening is blocked up to provide the same fire rating for the wall, and the projection of the new opening, at a right angle to the property line onto another *building*, lies not closer than 300 mm from a window in such other *building*, where the "opposite" window is less than 2 400 mm from the opposite new opening, and (b) except relocation of units, shall be restricted to the same *fire compartment* and shall conform to the requirements of Articles 3.2.3.14. or 9.10.12.3. where applicable, or (c) where a *building* does not satisfy the requirements of Subsection 3.2.3. for the amount of openings facing a yard or space that does not have sufficient *limiting distance*, such existing openings are allowed to be relocated provided: (i) such openings are not increased in size and they are protected with wired glass in steel frames conforming to Sentence 3.1.8.14.(2), or (ii) the *building* is *sprinklered*.
A18	3.2.4.	(a) Existing fire alarm system may remain except that Article 3.2.4.5. does not apply where the "Fire Safety Plan" (as described in Subsection 2.8.2. of the Fire Code) for the *building* addresses the intent of Subsection 3.2.4. (i.e. "stage" system, electrical supervision, detection as required, Fire Department connection and emergency power supply), and (b) extension of an existing system must ensure continuity and compatibility, and integrity of the system.
A19	3.2.5.3.(1) and (2)	Existing acceptable.
A20	3.2.5.5.; 3.2.5.6.; 3.2.5.4.	Existing acceptable provided the *building* is sprinklered.
A21	3.2.5.7.	Does not apply, except where a change in *major occupancy* occurs from a lesser *hazard index*.
A22	3.2.5.13.	Existing sprinkler systems in existing *buildings* that do not conform to NFPA 13 may be altered, added to, or extended from the existing system without complying with NFPA 13, provided the system is operational and adequate with respect to coverage, water supply and controls, and provided the system is evaluated by a qualified designer.
A23	3.2.6.	Reserved
A24	3.2.9.	(a) Does not apply to *buildings* 6 *storeys* and less. (b) Does not apply to *sprinklered buildings*.
A25	3.3.1.5.	One egress door is allowed where the *occupant load* is not greater than 100 persons, provided *floor area* is *sprinklered* and travel distance does not exceed 25 m.
A26	3.3.1.9.	Existing width of *public corridors* of not less than 914 mm is acceptable.
A27	3.3.1.9.(8)	An existing dead-end corridor is permitted where the *occupant load* is not greater than 20 persons, provided travel distance is not greater than 6 m plus corridor width to "*exit* choice" point.
A28	3.3.1.10.; 3.3.1.11.	Existing door swings may remain in *heritage buildings*, existing or being restored, with no change in *major occupancy* and with *occupant load* no greater than 100.
A29	3.3.1.12.	Existing doors may remain in a *heritage building*, existing or being restored, with no change in *major occupancy*.
A30	3.3.1.18.	Existing stained, etched, bevelled, leaded or figured glass acceptable.
A31	3.3.2.12.	Reserved
A32	3.3.5.4.(1); 3.3.5.7.(1) to (3)	Need not comply where a gasketed door and self closer are provided in the existing *fire separation*.
A33	3.4.1.5.(1)	Existing acceptable.
A34	3.4.1.5.(2)	Existing acceptable provided the existing guard is not less than 914 mm.
A35	3.4.1.8.	Existing stained, etched, bevelled, leaded or figured glass acceptable.
A36	3.4.2.5.(1)	Existing travel distance acceptable where *floor area* is *sprinklered* and where there is no change in *major occupancy*.
A37	3.4.3.2.(5)	Need not comply where there is no increase in *occupant load*.
A38	3.4.3.2.(7)	Existing width of *exits* acceptable provided the *occupant load* in not more than 15% above the *exit* capacity.
A39	3.4.3.4.	Existing acceptable.
A40	3.4.3.5.	Existing headroom clearance of not less than 1 980 mm is acceptable.
A41	3.4.4.4.(8)	Existing washrooms opening directly into an *exit* stairwell shall be separated from the *exit* stairwell by a 45 min *closure*.
A42	3.4.5.1.(2) and (7)	Existing illuminated legible *exit* signs are acceptable.
A43	3.4.6.2.	Existing acceptable, if visually apparent.
A44	3.4.6.3.	Existing acceptable.

COL. 1	COLUMN 2	COLUMN 3
A45	3.4.6.4.(2) to (8)	Existing acceptable.
A46	3.4.6.5.(2), (4) and (5)	Existing acceptable.
A47	3.4.6.6.(1)	Existing acceptable.
A48	3.4.6.7.; 3.4.6.8.	Existing acceptable.
A49	3.4.6.10.(1), (2) and (4)	Existing acceptable.
A50	3.4.6.11.	Existing acceptable in *public heritage buildings* or a change in *occupancy* with no increase in *occupant load*.
A51	3.4.6.15.(2) and (3)	Existing functionally operable panic hardware acceptable.
A52	3.4.7.2.	*Combustible* fire escapes which are protected from fire in accordance with Sentence 3.2.3.14.(2) are permitted or may be reconstructed or recreated (as in the case of a *heritage building*).
A53	3.5.1.	Existing acceptable.
A54	3.6.2.1.(7)	Existing *fire separation* of not less than 30 min is acceptable.
A55	3.6.2.2.	Existing acceptable where explosion-resistant *construction* or venting is provided.
A56	3.6.2.6.	Existing acceptable.
A57	3.6.2.8.(1)	2 h *fire separation* acceptable.
A58	3.6.3.1.(1) to (5)	45 min *fire separation* acceptable.
A59	3.6.3.3.(1) to (5) and (8)	Existing acceptable.
A60	3.6.3.3.(9)	1 h if *sprinklered*.
A61	3.6.3.3.(10)	Existing acceptable.
A62	3.6.3.4.	Existing acceptable.
A63	3.6.4.	Existing acceptable.
A64	3.7.1.3.(3)	2.1.m is acceptable.
A65	3.7.2.1.(3)	The minimum glass areas my be reduced by 50%.
A66	3.7.4.	Where the *occupant load* is increased by more than 15% above the capacity of the existing facilities, facilities to be added to accommodate the increase.
A67	3.8.1.2.	Existing accessible entrance acceptable. Existing curb ramp conforming to Sentence 3.8.3.2.(3) is acceptable.
A68	3.8.1.3.(1)	Existing unobstructed width of 920 mm minimum is acceptable.
A69	3.8.1.3.(4)	Existing unobstructed space not less than 1500 mm in width and 1500 mm in length located not more than 30 m apart is acceptable.
A70	3.8.3.3.(1)	Existing doorway acceptable, provided not less than 810 mm wide.
A71	3.8.3.4.(1)(a)	Existing ramp acceptable, provided not less than 870 mm between handrails.
A72	3.8.3.8.(1)(d)(i)	Existing grab bar is acceptable.
A73	3.8.3.13.(1)(f)	Existing grab bar is acceptable.
NUMBER	**PART 4 REQUIREMENTS**	**PART 11 COMPLIANCE ALTERNATIVE**
A74	4.1.8.	The requirements under this Subsection do not apply.
A75	6.2.2.1.(2)	Required outdoor air rates may be provided by mechanical, natural or combination of natural and mechanical means.
NUMBER	**PART 8 REQUIREMENTS**	**PART 11 COMPLIANCE ALTERNATIVE**
A76	8.2.1.4.	Existing clearances acceptable where: a *sewage system* is replaced with another *sewage system* within the same class; and, the capacity of the replacement *sewage system* does not exceed the capacity of the existing *sewage system*.
A77	8.2.1.4.	Existing clearances are acceptable where a replacement *sewage system* requires lesser clearances than those required in Part 8 for the existing *sewage system*.

Table 11.5.1.1.B.
Compliance Alternatives for Care or Detention Occupancies

Forming Part of Article 11.5.1.1.

COL. 1	COLUMN 2	COLUMN 3
NUMBER	**PART 3 REQUIREMENTS**	**PART 11 COMPLIANCE ALTERNATIVE**
B1	3.1.5.2.; 3.1.5.3.; 3.1.5.4.; 3.1.5.6.	Existing acceptable.
B2	3.1.5.7.; 3.1.5.8.; 3.1.5.9.; 3.1.5.10.	Except for exposed foamed plastics, existing acceptable.
B3	3.1.5.15.; 3.1.5.16.; 3.1.5.17.; 3.1.5.21.; 3.1.5.23.	Existing acceptable.
B4	3.1.7.1.	*Fire-resistance ratings* may also be used where they are based on: 1. Guideline on Fire Ratings of Archaic Materials and Assemblies, HUD No. 8. 2. Fire Endurance of Protected Steel Columns and Beams, DBR Technical Paper No. 194. 3. Fire Endurance of Unit Masonry Walls, DBR Technical Paper No 207. 4. Fire Endurance of Light-Framed and Miscellaneous Assemblies, DBR Technical Paper No. 222.

COL. 1	COLUMN 2	COLUMN 3
B5	3.1.7.5.(3)	Existing assemblies required to be of *noncombustible construction* may be supported by *combustible construction* having at least the same *fire-resistance rating* as that supported.
B6	3.1.8.5.(2)	(a) Existing functional and sound doors in existing *buildings* that are either hollow metal or kalamein and containing wired glass at least 6 mm thick and conforming to Sentence 3.1.8.14.(2) are permitted in lieu of doors not required to exceed 45 min, (b) all existing functional and sound hollow metal or kalamein doors which carry existing 1.5 h labels are acceptable in lieu of current 1.5 h labels and may contain wired glass panels not exceeding 0.0645 m², at least 6 mm thick and conforming to Sentence 3.1.8.14.(2), and (c) every fire door, window assembly or glass block used as a *closure* in a required *fire separation* shall be installed in conformance with good engineering practice.
B7	3.1.8.7.; 3.1.8.8.; 3.1.8.9.	*Fire dampers* or *fire stop flaps* are not required to be installed in existing ducts at penetrations of existing *fire separations*.
B8	3.1.8.10.(1)	For existing unlabelled doors in existing *buildings*, at least 45 mm solid core wood or metal clad are acceptable.
B9	3.1.8.11.(1)	Existing functionally operable self-closing devices acceptable, including devices with "pause" hardware.
B10	3.1.8.12.(1) and (2)	Between patient or inmate rooms, and corridors, existing "pause" type self-closing devices may be used as hold-open devices where functionally operable.
B11	3.1.8.13.	Existing functionally operable latching devices, excluding draw bolts, are acceptable.
B12	3.1.8.14.(1) and (2)	Except in zone or *exit fire separations* not required to be greater than 1 h, existing wired glass installations may be acceptable provided they are set in steel or metal-clad frames.
B13	3.1.8.14.(3)	Existing glass block acceptable.
B14	3.1.8.15.; 3.1.8.16.; 3.1.8.17.	Existing acceptable.
B15	3.1.9.5.(1) and (2)	Existing openings in existing ceiling membranes to remain. Existing openings may be moved to another location in the same ceiling provided the aggregate area of openings does not increase and are not cumulative, and the existing opening is blocked up to provide the same rating as the ceiling assembly.
B16	3.1.11.	Where the concealed space is being materially altered, provide smoke or heat detection in that space in lieu of firestops and tie into fire alarm system.
B17	3.1.14.; 3.1.15.	Existing roof assemblies and roof coverings acceptable.
B18	3.2.3.	Existing windows. (a) Existing windows in walls may be relocated to another part of the wall, provided the existing opening is blocked up to provide the same fire rating for the wall, and the projection of the new opening, at a right angle to the property line onto another *building*, lies no closer than 300 mm from a window in such other *building*, where the "opposite" window is less than 2 400 mm from the opposite new opening, and (b) except relocation of units, to be restricted to the same *fire compartment* and shall conform to the requirements of Articles 3.2.3.14. or 9.10.12.3. where applicable, or (c) where a *building* does not satisfy the requirements of Subsection 3.2.3. for the amount of openings facing a yard or space that does not have sufficient *limiting distance*, such existing openings are allowed to be relocated provided: (i) such openings are not increased in size and they are protected with wired glass in steel frames conforming to Sentence 3.1.8.14.(2), or (ii) the *building* is *sprinklered*.
B19	3.2.4.	(a) Existing fire alarm system may remain except that Article 3.2.4.5. does not apply where the "Fire Safety Plan" (as described in Subsection 2.8.2. of the Fire Code) for the *building* addresses the intent of Subsection 3.2.4. (i.e. "stage" system, electrical supervision, detection as required, Fire Department connection, and emergency power supply), and (b) extension of an existing system must ensure continuity and compatibility, and integrity of the system.
B20	3.2.5.1.; 3.2.5.2.	Existing access to an existing *occupancy* acceptable. Where the existing *building* is changed to a "B" *occupancy*, existing access may be acceptable.
B21	3.2.5.3.(1)	Existing acceptable, except where a change in *occupancy* occurs to a "B1" or "B2" *occupancy*.
B22	3.2.5.3.(2)	Existing acceptable.

COL. 1	COLUMN 2	COLUMN 3
B23	3.2.5.4.; 3.2.5.5.; 3.2.5.6.	Existing access route to existing *occupancy* is acceptable if the *building* is *sprinklered*. Where existing *building* is changed to a "B" *occupancy*, access route shall be provided.
B24	3.2.5.7.; 3.2.5.18.	Does not apply except where a change in *occupancy* occurs to a "B1" or "B2" *occupancy*, where occupants are not normally evacuated from the *building*.
B25	3.2.5.13.	Existing sprinkler systems in existing *buildings* that do not conform to NFPA 13 may be altered, added to, or extended from the existing system without complying with NFPA 13, provided the system is operational and adequate with respect to coverage, water supply and controls, and provided the system is evaluated by a qualified *designer*.
B26	3.2.6.	Reserved
B27	3.2.9.	Does not apply except where a change in *occupancy* occurs to a Group B *occupancy*, where occupants are not normally evacuated from the *building*.
B28	3.3.1.5.(1)(c); Table 3.3.1.5.B.	Column 2 to read: 100 m^2 for "B1" and "B2" (sleeping rooms) and 200 m^2 for "B2" (other rooms).
B29	3.3.1.9.	Existing width of *public corridors* of not less than 914 mm is acceptable, except as provided in Sentence 3.3.3.3.(2).
B30	3.3.1.10.; 3.3.1.11.	Existing door swings may remain in *heritage buildings*, existing or being restored, with no change in *major occupancy* and with *occupant load* no greater than 100.
B31	3.3.1.12.	Existing doors acceptable.
B32	3.3.1.15.	Existing acceptable.
B33	3.3.1.16.	Existing non-conforming capacities of *access to exits* are acceptable, provided that the excessive capacity is no greater than 15%, and (a) corridor *separations* are rated to Code plus early warning system provided, or (b) there are sprinklers, plus *smoke alarms* in *suites*.
B34	3.3.1.17.	Existing acceptable.
B35	3.3.1.18.	Existing stained, etched, bevelled, leaded or figured glass acceptable.
B36	3.3.3.3.(1)	Existing dead end corridors acceptable with 30 min *fire separation* of corridor plus sprinklering of *floor area*, provided the *occupant load* is not greater than 10 persons and travel distance not greater than 6 m plus corridor width to "*exit* choice" point.
B37	3.3.3.7.	45 min *fire separation* acceptable.
B38	3.3.5.4.(1); 3.3.5.7.(3)	Need not comply where a gasketed door and self closer are provided in the existing *fire separation*.
B39	3.4.1.8.	Existing stained, etched, bevelled, leaded or figured glass acceptable.
B40	3.4.2.5.(1)	Existing travel distance acceptable where *floor area* is *sprinklered* and provided *fire separations* comply with Part 3.
B41	3.4.3.2.(7)	Existing acceptable provided there is no change in *occupancy* to a "B2" or "B3".
B42	3.4.3.4.	Existing acceptable.
B43	3.4.3.5.	Existing headroom clearance of not less than 1 980 mm is acceptable.
B44	3.4.5.1.(2) and (7)	Existing illuminated legible *exit* signs are acceptable.
B45	3.4.6.2.	Existing acceptable, if visually apparent.
B46	3.4.6.3.(1)	Existing acceptable with a rise of no greater than 3.7 m.
B47	3.4.6.3.(2)	Existing acceptable provided there is no change in *occupancy* to a "B2" or "B3".
B48	3.4.6.4.(2) to (9)	Existing acceptable.
B49	3.4.6.5.(2) to (5)	Existing acceptable.
B50	3.4.6.6.(1)	Existing acceptable.
B51	3.4.6.7.	Existing acceptable.
B52	3.4.6.8.	Existing acceptable where there is no change in *major occupancy* or increase in *occupant load* greater than 15%.
B53	3.4.6.10.(1), (2) and (4)	Existing acceptable.
B54	3.4.6.11.	Existing acceptable in *public heritage buildings*.
B55	3.4.6.15.(2) and (3)	Existing functionally operable panic hardware acceptable.
B56	3.4.6.17.(1)(c)	Existing access to existing *occupancy* is acceptable Where the existing *building* is changed to a "B" *occupancy*, existing access may be acceptable.
B57	3.4.7.2.	*Combustible* fire escapes which are protected from fire in accordance with Sentence 3.2.3.14.(2) are permitted or may be reconstructed or recreated (as in the case of a *heritage building*). Where serving non-ambulatory persons, minimum width shall be 1 100 mm.
B58	3.5.1.	Existing acceptable, except where *building* is classified under Subsection 3.2.6.
B59	3.6.2.1.(7)	45 min *fire separation* acceptable.
B60	3.6.2.6.	Existing acceptable.
B61	3.6.2.7.(1)	2 h *fire separation* acceptable.
B62	3.6.3.1.(1) to (5)	45 min *fire separation* acceptable.

COL. 1	COLUMN 2	COLUMN 3
B63	3.6.3.3.(1), (3), (4)(a), (5) and (10)	Existing acceptable.
B64	3.6.3.3.(2)(a)	45 min *fire separation* acceptable.
B65	3.6.4.	Existing acceptable, except where a change in *occupancy* occurs to a Group B *occupancy*.
B66	3.7.1.3.(1)	Existing acceptable.
B67	3.7.2.1.(2)	The minimum glass areas may be reduced by 50%.
B68	3.7.4.	Where the *occupant load* is increased by more than 15% above the capacity of the existing facilities, facilities to be added to accommodate the increase.
B69	3.8.1.2.	Existing accessible entrance acceptable. Existing curb ramp conforming to Sentence 3.8.3.2.(3) is acceptable.
B70	3.8.1.3.(1)	Existing unobstructed width of 920 mm minimum is acceptable.
B71	3.8.1.3.(4)	Existing unobstructed space not less than 1500 mm in width and 1500 mm in length located not more than 30 m apart is acceptable.
B72	3.8.3.3.(1)	Existing doorway acceptable, provided not less than 810 mm wide.
B73	3.8.3.4.(1)(a)	Existing ramp acceptable, provided not less than 870 mm between handrails.
B74	3.8.3.8.(1)(d)(i)	Existing grab bar is acceptable.
B75	3.8.3.13.(1)(f)	Existing grab bar is acceptable.
NUMBER	**PART 4 REQUIREMENTS**	**PART 11 COMPLIANCE ALTERNATIVE**
B76	4.1.8.	The requirements under this Subsection do not apply.
NUMBER	**PART 8 REQUIREMENTS**	**PART 11 COMPLIANCE ALTERNATIVE**
B77	6.2.2.1.(2)	Required outdoor air rates may be provided by mechanical, natural or combination of natural and mechanical means.
B78	8.2.1.4.	Existing clearances acceptable where: a *sewage system* is replaced with another *sewage system* within the same class; and, the capacity of the replacement *sewage system* does not exceed the capacity of the existing *sewage system*.
B79	8.2.1.4.	Existing clearances are acceptable where a replacement *sewage system* requires lesser clearances than those required in Part 8 for the existing *sewage system*.

Table 11.5.1.1.C.
Compliance Alternatives for Residential Occupancies

Forming Part of Article 11.5.1.1.

COL. 1	COLUMN 2	COLUMN 3
NUMBER	**PART 3 REQUIREMENTS**	**PART 11 COMPLIANCE ALTERNATIVE**
C1	3.1.4.6.	Existing *heavy timber construction* acceptable where *construction* is within 90% of member sizes listed in Part 3.
C2	3.1.5.2.; 3.1.5.3.; 3.1.5.4.; 3.1.5.6.	Existing acceptable.
C3	3.1.5.7.; 3.1.5.8.; 3.1.5.9.; 3.1.5.10.	Except for exposed foamed plastics, existing acceptable. To match existing, materials may be added from on or off site.
C4	3.1.5.14.; 3.1.5.15.; 3.1.5.16.; 3.1.5.17.; 3.1.5.21.; 3.1.5.23.	Existing acceptable.
C5	3.1.7.1.	*Fire-resistance ratings* may also be used where they are based on: 1. Guideline on Fire Ratings of Archaic Materials and Assemblies, HUD No. 8. 2. Fire Endurance of Protected Steel Columns and Beams, DBR Technical Paper No. 194. 3. Fire Endurance of Unit Masonry Walls, DBR Technical Paper No. 207. 4. Fire Endurance of Light-Framed and Miscellaneous Assemblies, DBR Technical Paper No. 222.
C6	3.1.7.5.(3)	Existing assemblies required to be of *noncombustible construction* may be supported by *combustible construction* having at least the same *fire-resistance rating* as that supported.
C7	3.1.8.1.(2); 3.1.8.6.(1) and (2)	Existing functional *closures* are acceptable and may be relocated within the same existing *fire separation*.
C8	3.1.8.5.(2)	(a) Existing functional and sound doors in existing *buildings* that are either hollow metal or kalamein and containing wired glass at least 6 mm thick and conforming to Sentence 3.1.8.14.(2) are permitted in lieu of doors not required to exceed 45 min, (b) all existing functional and sound hollow metal or kalamein doors which carry existing 1.5 h labels are acceptable in lieu of current 1.5 h labels and may contain wired glass panels not exceeding 0.0645 m^2, at least 6 mm thick and conforming to Sentence 3.1.8.14.(2), and (c) every fire door, window assembly or glass block used as a *closure* in a required *fire separation* shall be installed in conformance with good engineering practice.
C9	3.1.8.7.; 3.1.8.8.; 3.1.8.9.	Except for *hotels*, *fire dampers* or *fire stop flaps* are not required to be installed in existing ducts at penetrations of existing *fire separations*.

COL. 1	COLUMN 2	COLUMN 3
C10	3.1.8.10.(1)	For existing unlabeled doors in existing *buildings*, at least 45 min solid core wood or metal clad are acceptable. Except for *residential occupancies*, existing closure rating of 20 min will not be required where the entire *floor area* is *sprinklered*.
C11	3.1.8.13.	Existing functionally operable latching devices, excluding draw bolts, are acceptable.
C12	3.1.8.14.	Existing transoms or sidelights located in *fire separations* not required to be greater than 1 h may be retained if wired glass, at least 6 mm thick, is securely fixed to a wood frame of at least 50 mm thickness with steel stops. Operable transoms shall be fixed closed.
C13	3.1.8.15.; 3.1.8.16.; 3.1.8.17.	Existing acceptable.
C14	3.1.11.	Where the concealed space is being materially altered, provide smoke or heat detection in that space in lieu of firestops and tie into fire alarm system.
C15	3.2.2.17.(1)(b) and (c)	Existing sprinkler systems in 1 *storey buildings* need not comply.
C16	3.2.3.	Existing windows. (a) Existing windows in walls may be relocated to another part of the wall, provided the existing opening is blocked up to provide the same fire rating for the wall, and the projection of the new opening, at a right angle to the property line onto another *building*, lies not closer than 300 mm from a window in such other *building*, where the "opposite" window is less than 2 400 mm from the opposite new opening, and (b) except relocation of units, shall be restricted to the same *fire compartment* and shall conform to the requirements of Articles 3.2.3.14. or 9.10.12.3. where applicable, or (c) where a *building* does not satisfy the requirements of Subsection 3.2.3. for the amount of openings facing a yard or space that does not have sufficient *limiting distance*, such existing openings are allowed to be relocated provided: (i) such openings are not increased in size and they are protected with wired glass in steel frames conforming to Sentence 3.1.8.14.(2), or (ii) the *building* is *sprinklered*.
C17	3.2.4.	(a) Existing fire alarm system may remain except that Article 3.2.4.5. does not apply where the "Fire Safety Plan" (as described in Subsection 2.8.2. of the Fire Code) for the *building* addresses the intent of Subsection 3.2.4. (i.e. "stage" system, electrical supervision, detection as required, Fire Department connection, and emergency power supply), and (b) extension of an existing system must ensure continuity and compatibility, and integrity of the system.
C18	3.2.4.21.	Such *smoke alarms* may be battery operated.
C19	3.2.5.1.; 3.2.5.2.	Existing acceptable.
C20	3.2.5.3.(1)	Existing access acceptable.
C21	3.2.5.3.(2)	Existing acceptable.
C22	3.2.5.4.; 3.2.5.5.; 3.2.5.6.	(a) For *buildings* 6 *storeys* and less, existing access to existing *occupancy* is acceptable, and (b) where existing *building* is changed to a "C" *occupancy*, an access route shall be provided, or the existing access is acceptable provided the *building* is *sprinklered*.
C23	3.2.5.7.	Existing water supply and hydrants are acceptable in *buildings* up to 6 *storeys* in *building height*.
C24	3.2.5.13.	Existing sprinkler systems in existing *buildings* that do not conform to NFPA 13 may be altered, added to, or extended from the existing system without complying with NFPA 13, provided the system is operational and adequate with respect to coverage, water supply and controls, and provided the system is evaluated by a qualified designer.
C25	3.2.6.	Reserved
C26	3.2.9.	Does not apply to *buildings* 4 *storeys* and and less. For existing *buildings* over 4 *storeys* in *building height*, existing standpipe and hose systems water supply is acceptable provided it can deliver a minimum flow rate of 265 L/min for 30 min at 345 kPa (gauge) at the two highest and most remote hose valves, with not less than 132 L/min from each of the two simultaneously.
C27	3.3.1.4.(1); 3.3.4.2.(1)	30 min is acceptable to separate corridors or *exits* in *buildings* not exceeding 6 *storeys* in *building height*, except that 45 min is required for *exits* in *buildings* exceeding 3 *storeys* in *building height*. For *buildings* exceeding 6 *storeys* in *building height*, 30 min is acceptable where *smoke detectors* are installed in corridors, except 1 h is required in *exits*. 30 min is acceptable to separate *public corridors*, *exits* or *suites* in *hotels*, provided *fire detectors* are installed in every room in a *suite* and in every room not located in a *suite*, other than corridors, washrooms, closets in *suites*, saunas, refrigerated areas and swimming pools.

COL. 1	COLUMN 2	COLUMN 3
C28	3.3.1.5.(1)(c); Tables 3.3.1.5.A. and 3.3.1.5.B.	In Column 2, maximum area of room or *suite* to be unlimited.
C29	3.3.1.9.	Existing width of *public corridors* of not less than 914 mm is acceptable.
C30	3.3.1.10.; 3.3.1.11.	Existing door swings may remain in *heritage buildings*, existing or being restored, with no change in *major occupancy* and with *occupant load* no greater than 100.
C31	3.3.1.12.	Existing doors acceptable, provided not less than 600 mm wide.
C32	3.3.1.15.	Existing curved or spiral stairs acceptable.
C33	3.3.1.16.	Existing non-conforming capacities of *access to exits* are acceptable, provided that the excessive capacity is no greater than 15%, (a) corridor *fire separations* are to be rated to Code plus early warning system provided, or (b) there are sprinklers, plus *smoke alarms* in *suites*.
C34	3.3.1.17.	Does not apply to *heritage buildings*.
C35	3.3.1.18.	Existing stained, etched, bevelled, leaded or figured glass acceptable.
C36	3.3.4.2.(3)(b)(i) 3.3.4.2.(3)(b)(ii), (iii) 3.3.4.2.(3)(b)(iv)	30 min *fire separation* acceptable. 45 min *fire separation* acceptable. 1.5 h *fire separation* acceptable.
C37	3.3.4.4.(5) and (6)	For *buildings* 6 *storeys* and less, doorway from *dwelling unit* will be permitted to open directly into *exit* stairway or interior corridor served by a single *exit* if a fire alarm system complying with Subsection 3.2.4. is installed and the *dwelling unit* has a second and separate *means of egress*.
C38	3.3.5.4.(1) and 3.3.5.7.(3)	Need not comply where a gasketed door and self closer are provided in the existing *fire separation*.
C39	3.4.1.4.	Except for *hotels*, the following types of *exits* may also be used for *buildings* not over 6 *storeys* in *building height* (a) connected balconies, which connect across *firewalls*, or connect to another *exit*, or with access to ground level. (b) areas of refuge where fire service rescue is possible and that comply with Measure L of Sentences (4) to (10), (18) and (20)(a), (b) and (d) in Supplementary Standard SB-4.
C40	3.4.1.8.	Existing stained, etched, bevelled, leaded or figured glass acceptable.
C41	3.4.2.5.(1)	Existing travel distance acceptable where *floor area* is *sprinklered* and provided *fire separations* comply with Part 3.
C42	3.4.3.2.(7)	Existing width of *exits* acceptable provided the *occupant load* is not more than 15% above the *exit* capacity.
C43	3.4.3.4.	Except for *heritage buildings*, existing acceptable, provided not less than 800 mm.
C44	3.4.3.5.	Existing headroom clearance of not less than 1 980 mm is acceptable.
C45	3.4.4.1.(1)	Except for *exits*, no rating required where *floor areas* are *sprinklered*.
C46	3.4.4.1.	*Fire separations* of *exits* permitted in *buildings*: - 30 min, up to 3 *storeys* in *building height*; - 45 min, in *hotels* up to 3 *storeys* in *building height*; - 45 min, up to 6 *storeys* in *building height*; - 1 h, over 6 *storeys* in *building height*.
C47	3.4.4.4.(8)	Existing washrooms opening directly into an *exit* stairwell shall be separated from the *exit* stairwell by a 45 min *closure*.
C48	3.4.5.1.(2) and (7)	Existing illuminated legible *exit* signs are acceptable.
C49	3.4.6.1.	Existing acceptable.
C50	3.4.6.2.	Existing acceptable, if visually apparent.
C51	3.4.6.3.(1) and (2)	Existing acceptable with rise no greater than 3.7 m.
C52	3.4.6.3.(3) and (4)	Existing acceptable.
C53	3.4.6.4.(2) and (8)	Existing acceptable.
C54	3.4.6.5. (2) and (4)	Existing acceptable.
C55	3.4.6.6.(1)	Existing acceptable.
C56	3.4.6.7.; 3.4.6.8.	Existing acceptable.
C57	3.4.6.9.(2) to (6)	Existing acceptable.
C58	3.4.6.10.(1) and (2)	Existing acceptable.
C59	3.4.6.11.	Existing acceptable in *heritage buildings* provided the *occupant load* is not more than 60.
C60	3.4.6.15.(1) to (3)	Existing functionally operable panic hardware acceptable.
C61	3.4.7.2.	*Combustible* fire escapes which are protected from fire in accordance with Sentence 3.2.3.14.(2) are permitted or may be reconstructed or recreated (as in the case of a *heritage building*).
C62	3.5.1.	Existing acceptable except where *building* is classified under Subsection 3.2.6.
C63	3.6.2.1.(7)	45 min *fire separation* acceptable.
C64	3.6.2.2.	Existing acceptable where explosion-resistant *construction* or venting is provided.

COL. 1	COLUMN 2	COLUMN 3
C65	3.6.2.6.	Existing acceptable.
C66	3.6.2.7.(1)	2 h *fire separation* acceptable.
C67	3.6.3.1.(1) to (5)	45 min *fire separation* acceptable up to 6 *storeys.*
C68	3.6.3.3.(2)	Where 2 h *fire separation* is required,1 h is acceptable. Except for linen discharge rooms where 1 h *fire separation* is required, 45 min is acceptable.
C69	3.6.3.3.(4) and (5)	Existing sizes acceptable.
C70	3.6.3.3.(9)	Where 2 h *fire separation* is required,1 h is acceptable.
C71	3.6.4.2.	Ceiling *fire separation* need not be fire-resistance rated where sprinklering, subject to C.A. C24, of *fire compartments* on both sides of vertical *fire separation* is provided and where such *fire separation* is not required to exceed 1 h.
C72	3.6.4.3.(1)	Existing to meet *flame-spread rating* of 25 or to be *sprinklered.*
C73	3.6.4.4.; 3.6.4.5.; 3.6.4.6.	Existing access acceptable.
C74	3.7.1.1.(2)	Minimum room height shall be not less than 1 950 mm over the required floor area and any location that would normally be used as a *means of egress.*
C75	3.7.2.1.	(a) Where windows are not used as *means of egress* and where they do not conflict with ventilation requirements, the minimum glass areas as shown in Table 9.7.1.2. may be reduced by 50%, or (b) an existing room converted to an interior room, created by an addition, shall not require a window, provided there is an opening in a dividing wall occupying not less than 30% of the separating plane to an adjoining room, where the adjoining room has a minimum of 5% window area of the combined floor areas, and provided the required ventilation for the combined rooms is maintained.
C76	3.7.4.	Where the *occupant load* is increased by more than 15% above the capacity of the existing facilities, facilities to be added to accommodate the increase.
C77	3.8.1.2.	Existing accessible entrance acceptable. Existing curb ramp conforming to Sentence 3.8.3.2.(3) is acceptable.
C78	3.8.1.3.(1)	Existing unobstructed width of 920 mm minimum is acceptable.
C79	3.8.1.3.(4)	Existing unobstructed space not less than 1500 mm in width and 1500 mm in length located not more than 30 m apart is acceptable.
C80	3.8.3.3.(1)	Existing doorway acceptable, provided not less than 810 mm wide.
C81	3.8.3.4.(1)(a)	Existing ramp acceptable, provided not less than 870 mm between handrails.
C82	3.8.3.8.(1)(d)(i)	Existing grab bar is acceptable.
C83	3.8.3.13.(1)(f)	Existing grab bar is acceptable.
NUMBER	**PART 4 REQUIREMENTS**	**PART 11 COMPLIANCE ALTERNATIVE**
C84	4.1.8.	The requirements under this Subsection do not apply.
NUMBER	**PART 6 REQUIREMENTS**	**PART 11 COMPLIANCE ALTERNATIVE**
C85	6.2.2.1.(2)	Required outdoor air rates may be provided by mechanical, natural or combination of natural and mechanical means.
C86	6.2.3.2.; 6.2.3.8.; 6.2.3.16; 6.2.3.17.	Existing acceptable.
C87	6.2.3.9.(1)	In a *building* containing not more than four *dwelling units* or *residential suites*, the existing heating or *air conditioning* system may be altered to serve more than one *dwelling unit* or *suite* provided *smoke alarms* are installed in each *dwelling unit* or *suite* and provided *a smoke detector is* installed in the supply or return air duct system serving the entire *building* which would turn off the fuel supply and electrical power to the heating system upon activation of such detector.
C88	6.2.3.12.	Existing openings, grilles and diffusers acceptable.
C89	6.2.4.2.(1); 6.2.4.3.(1) to (3) and (5)	Existing acceptable.
C90	6.2.4.3.(10)	Where the duct system is being altered, lesser amounts and extent of insulation will be permitted.
C91	6.2.4.7.(10)	In a *building* containing not more than four *dwelling units* or *residential suites*, the existing heating or *air conditioning* system may be altered to serve more than one *dwelling unit* or *suite* provided *smoke alarms* are installed in each *dwelling unit* or *suite* and provided a *smoke detector* is installed in the supply or return air duct system serving the entire *building* which would turn off the fuel supply and electrical power to the heating system upon activation of such detector.
C92	6.2.9.2.	Existing acceptable.
C93	6.2.12.3.(1)	Carbon monoxide detectors may be battery operated or plugged into an electrical outlet.
C94	6.3.1.	Existing acceptable, provided products of combustion are safely vented.
NUMBER	**PART 8 REQUIREMENTS**	**PART 11 COMPLIANCE ALTERNATIVE**
C95	8.2.1.4.	Existing clearances acceptable where: a *sewage system* is replaced with another *sewage system* within the same class; and, the capacity of the replacement *sewage system* does not exceed the capacity of the existing *sewage system.*

Col. 1	Column 2	Column 3
C96	8.2.1.4.	Existing clearances are acceptable where a replacement *sewage system* requires lesser clearances than those required in Part 8 for the existing *sewage system*.
NUMBER	**PART 9 REQUIREMENTS**	**PART 11 COMPLIANCE ALTERNATIVE**
C97	9.3.2.1.	Sound used lumber may be acceptable for reuse without a grade stamp provided that: (a) visual examination shows no excessive weakening by holes, notches, nail splits or other damage, (b) where the grade or species is unknown, the minimum grade shall apply for span table use, and (c) lumber has not been subjected to termite infestation.
C98	9.5.3.1.	In detached houses, semi-detached houses, townhouses and row houses containing not more than two *dwelling units*, (a) minimum room height shall not be less than 1 950 mm over the required floor area and in any location that would normally be used as a *means of egress*, or (b) minimum room height shall not be less than 2 030 mm over at least 50% of the required floor area, provided that any part of the floor having a clear height of less than 1 400 mm shall not be considered in computing the required floor area.
C99	9.6.3.1.	Doors may be lesser heights to suit ceiling heights.
C100	9.6.3.2.	Except where required in 9.9.2.1.(4) existing acceptable, provided not less than 600 mm.
C101	9.6.5.	Existing acceptable.
C102	9.6.6.2.; 9.6.6.3.	Existing doors and sidelights being reused or relocated need not conform if identified or protected.
C103	9.7.1.2.	(a) Where windows are not used as a *means of egress* and where they do not conflict with ventilation requirements, the minimum glass areas as shown in Table 9.7.1.2. may be reduced by 50%, and (b) an existing room converted to an interior room created by an addition shall not require a window, provided there is an opening in a dividing wall occupying not less than 30% of the separating plane to an adjoining room where the adjoining room has a minimum of 5% window area of the combined floor areas, and provided the required ventilation for the combined room is maintained.
C104	9.7.1.3.	In detached houses, semi-detached houses, townhouses and row houses containing not more than two *dwelling units*, existing acceptable, where there is direct access to the exterior.
C105	9.7.1.7.	Existing acceptable.
C106	9.7.5.1.	Existing acceptable, if marked to indicate their existence and position.
C107	9.8.1. to 9.8.4.	Replacement or extension of existing stair systems shall be exempt from the provisions of these Articles, except that they shall have: (a) a minimum width between wall faces of 700 mm, and (b) a minimum clear height over tread nosing of or landing 1 800 mm.
C108	9.8.4.4.	Existing curved or spiral stairs are acceptable.
C109	9.8.4.5.	Where a stair complies with Subsection 9.8.4., an extension to a stair may contain two sets of winders provided that they are separated by at least 3 treads or a landing.
C110	9.8.5.1.(2)	Existing ramps acceptable, where practical.
C111	9.8.7.	Existing handrails acceptable, unless considered unsafe by *chief building official*.
NUMBER	**PART 9 REQUIREMENTS**	**PART 11 COMPLIANCE ALTERNATIVE**
C112	9.8.8.	Existing *guards* acceptable, unless considered unsafe by *chief building official*.
C113	9.8.9.6.(4)	Existing acceptable.
C114	9.9.2.1.(1) to (3)	Except for *hotels*, the following types of *exits* may also be used: (a) connected balconies, which connect across *firewalls*, or connect to another *exit*, or with access to ground level, (b) areas of refuge approved by the *chief building official*, where fire service rescue is possible, or (c) *combustible* or *noncombustible* exterior stairways or fire escapes which are protected in accordance with Sentence 3.2.3.13.(2). These may be reconstructed or recreated (as in the case of a *heritage building*).
C115	9.9.2.1.(4)	Except for *hotels*, existing acceptable.
C116	9.9.3.2.	(a) In a *building* containing not more than four *dwelling units*, the width of every *exit* facility may be as the existing, but not less than 800 mm, or (b) in a *building* containing more than four *dwelling units*, the width of every *exit* facility may be as the existing, but not less than 900 mm.
C117	9.9.3.3.	(a) In a *building* containing not more than four *dwelling units*, the minimum width of a *public corridor* may be 800 mm, or (b) in a *building* containing more than four *dwelling units*, the minimum width of a *public corridor* may be 900 mm.
C118	9.9.3.4.	Existing clear height of not less than 1 950 mm is acceptable.

COL. 1	COLUMN 2	COLUMN 3
C119	9.9.4.2.	Except as permitted in C.A. C134, in a *building* containing not more than four *dwelling units* or *suites*, one *exit* need not be separated from the remainder of the *building* at the *first storey* where there are one or more other *exits* complying with C.A. C120.
C120	9.9.4.2.(1) and (2)	30 min *fire separation* acceptable.
C121	9.9.5.4.	Existing acceptable.
C122	9.9.5.8.	Existing acceptable provided minimum 45 min *fire separation* and where explosion-resistant *construction* or venting is provided.
C123	9.9.5.9.	Existing acceptable, provided that the enclosure has a 45 min *fire-resistance rating*.
C124	9.9.6.1.	Except for *hotels*, existing acceptable.
C125	9.9.6.2.	Existing clear opening height of not less than 1 950 mm is acceptable, with existing door heights to be acceptable.
C126	9.9.6.3.	Existing door widths are acceptable, provided *exit* widths conform to C.A. C116.
C127	9.9.6.5.	Existing door swings acceptable. Existing acceptable in *public heritage buildings*, where approved by *chief building official*.
C128	9.9.6.6.(1)	Where *exit* doors open onto a landing, they shall not extend beyond the face of the first riser.
C129	9.9.6.8.	Existing functionally operable passage or panic hardware acceptable.
C130	9.9.7.4.(1)(a)	Maximum area of existing room or *suite* does not apply.
C131	9.9.7.5.	Except as provided in C.A. C134, in detached houses, semi-detached houses, townhouses row houses containing not more than two *dwelling units*, requirement applies.
C132	9.9.8.2.(1)	Existing travel distance acceptable where *floor area* is *sprinklered* and provided *fire separations* comply with Part 9.
C133	9.9.8.5.	In a *building* containing not more than four *dwelling units* or *suites*, existing glazed solid wood doors to lobby may remain in lieu of new 20 minute doors, provided the *fire separations* for the floor above or below are provided as per C.A. C144, and a second *means of egress* from the *dwelling units* complies with the Code requirements.
C134	9.9.9.	In detached houses, semi-detached houses, townhouses and row houses containing not more than two *dwelling units*, *exit* requirements are acceptable if at least one of the following conditions exists: (a) a door, including a sliding door, that opens directly to the exterior from a *dwelling unit*, serves only that *dwelling unit* and has reasonable access to ground level, and the *dwelling units* are equipped with *smoke alarms* installed in conformance with Subsection 9.10.19.,
		(b) an *exit* that is accessible to more than one *dwelling unit* and provides the only *means of egress* from each *dwelling unit*, provided that the *means of egress* is separated from the remainder of the *building* and common areas by a *fire separation* having a 30 min *fire-resistance rating* and provided further that the required *access to exit* from any *dwelling unit* cannot be through another *dwelling unit*, *service room* or other *occupancy*, and both *dwelling units* and common areas are provided with *smoke alarms* installed in conformance with Subsection 9.10.19. and are interconnected, or (c) access to an *exit* from one *dwelling unit* which leads through another *dwelling unit* where (i) an additional means of escape is provided through a window that conforms to the following: - the sill height is not more than 1 000 mm above or below adjacent ground level, - the window can be opened from the inside without the use of tools, - the window has an individual unobstructed open portion having a minimum area of 0.38 m² with no dimension less than 460 mm, - the sill height does not exceed 900 mm above the floor or fixed steps, - where the window opens into a window well, a clearance of not less than 1 000 mm shall be provided in front of the window, and - *smoke alarms* are installed in every *dwelling unit* and in common areas in conformance with Subsection 9.10.19. and are interconnected, (ii) an additional means of escape is provided through a window that conforms to the following: - a casement window not less than 1 060 mm high, 560 mm wide, with a sill height not more than 900 mm above the inside floor, - the sill height of the window is not more than 5 m above adjacent ground level, and - *smoke alarms* are installed in every *dwelling unit* and in common areas in conformance with Subsection 9.10.19. and are interconnected, or

COL. 1	COLUMN 2	COLUMN 3
		(iii) the *building* is *sprinklered* and the *dwelling units* are equipped with *smoke alarms* installed in conformance with Subsection 9.10.19.
C135	9.9.10.	In detached houses, semi-detached houses, townhouses and row houses containing not more than two *dwelling units*, the requirements under this Subsection do not apply.
C136	9.9.10.6.	Existing illuminated legible signs are acceptable for *exit* signs, if approved by *chief building official*.
C137	9.9.11.	In detached houses, semi-detached houses, townhouses and row houses containing not more than two *dwelling units*, the requirements under this Subsection apply only where the condition described in (b) of C.A. C134 exists.
C138	9.10.1.1.	Assemblies required to be of *noncombustible construction* may be supported by *combustible construction* having at least the same *fire-resistance rating* as that supported.
C139	9.10.1.3.(8)	Existing installations acceptable subject to C.A.'s C23, C24 and C26.
C140	9.10.3.	*Fire-resistance ratings* may also be used where they are based on: 1. Guideline on Fire Ratings of Archaic Materials and Assemblies, HUD No. 8. 2. Fire Endurance of Protected Steel Columns and Beams, DBR Technical Paper No. 194. 3. Fire Endurance of Unit Masonry Walls, DBR Technical Paper No. 207. 4. Fire Endurance of Light-Framed and Miscellaneous Assemblies, DBR Technical Paper No. 222.
C141	9.10.5.1.	Existing openings in existing wall or ceiling membranes to remain. Existing openings may be moved to another location in the same wall or ceiling, provided the aggregate area of openings does not increase and are not accumulative, and the existing opening is blocked up to provide the same rating as the existing wall or ceiling assembly.
C142	9.10.6.2.	Existing *heavy timber construction* acceptable where *construction* is within 90% of member sizes listed in Part 3.
C143	9.10.7.	Existing acceptable for *heritage buildings*, subject to approval of *chief building official*.
C144	9.10.8.1.; 9.10.8.3.; 9.10.8.8.	(a) Except as provided in (b) and (c), 30 min rating is acceptable. (b) In detached houses, semi-detached houses, townhouses and row houses containing not more than two *dwelling units*, 15 min horizontal *fire separation* is acceptable where (i) *smoke alarms* are installed in every *dwelling unit* and in common areas in conformance with Subsection 9.10.19. and
		(ii) *smoke alarms* are interconnected. (c) In detached houses, semi-detached houses townhouses and row houses containing not more than two *dwelling units*, the *fire-resistance rating* of the *fire separation* is waived where the *building* is *sprinklered*.
C145	9.10.9.7.; 9.10.9.9.	Existing acceptable in existing *fire separations*.
C146	9.10.9.10.(1)	Ceiling *fire separation* need not be *fire-resistance rated* where sprinklering, subject to C.A. C24, of *fire compartments* on both sides of vertical *fire separation* is provided and where such *fire separation* is not required to exceed 1 h.
C147	9.10.9.11.(1)	Except for *hotels*, 30 min *fire separation* acceptable.
C148	9.10.9.11.(2)	In lieu of the 2 h *fire separation*,sprinklers may be used in the *mercantile occupancy* or *medium hazard industrial occupancy*, with a 1 h *fire separation*.
C149	9.10.9.14.(1) and (3); 9.10.9.15.(1)	(a) Except as provided in (b) and (c), 30 min *fire separation* is acceptable. (b) In detached houses, semi-detached houses, townhouses and row houses containing not more than two *dwelling units*, 15 min horizontal *fire separation* is acceptable where (i) *smoke alarms* are installed in every *dwelling unit* and in common areas in conformance with Subsection 9.10.19., and (ii) *smoke alarms* are interconnected. (c) In detached houses, semi-detached houses, townhouses and row houses containing not more than two *dwelling units*, the *fire-resistance rating* of the *fire separation* is waived where the *building* is *sprinklered*.
C150	9.10.10.3.	(a) Except as provided in (b) and (c) and in Articles 9.10.10.5. and 9.10.10.6., 30 min *fire separation* is acceptable. (b) In detached houses, semi-detached houses, townhouses and row houses containing not more than two *dwelling units*, the *fire-resistance rating* of the vertical *fire separation* is waived where (i) *smoke alarms* are installed in every *dwelling unit* and in common areas in conformance with Subsection 9.10.19., and (ii) *smoke alarms* are interconnected.

COL. 1	COLUMN 2	COLUMN 3
		(c) In detached houses, semi-detached houses, townhouses and row houses containing not more than two *dwelling units*, the *fire-resistance rating* of the vertical *fire separation* is waived where *service rooms* are *sprinklered*.
C151	9.10.11.2.(1)	In detached houses, semi-detached houses, townhouses and row houses containing not more than two *dwelling units*, a *party wall* with 1 h *fire-resistance rating* is acceptable.
C152	9.10.13.1	Existing functional *closures* are acceptable subject to C.A.'s C8. and C153.
C153	9.10.13.2.(1)	In detached houses, semi-detached houses, townhouses and row houses containing not more than two *dwelling units*, existing unlabelled doors at least 45 mm solid core wood or metal clad are acceptable. For existing *closures*, ratings of 20 min will not be required where the entire *floor area* is *sprinklered*.
C154	9.10.13.2.(1)	In a *building* containing not more than four *dwelling units* or *suites*, existing glazed solid wood doors to corridors may remain in lieu of new 20 min doors, provided they are not located in a dead end corridor.
C155	9.10.13.3.	Existing acceptable provided that wood door frames are secured with hinge screws going through frame into the stud.
C156	9.10.13.5.	Existing wired glass acceptable. Existing transoms or sidelights located in required *fire separations* may be retained if wired glass at least 6 mm thick is securely fixed to a wood frame of at least 50 mm thickness with steel stops. Operable transoms shall be fixed closed.
C157	9.10.13.6.	Existing steel door frames acceptable.
C158	9.10.13.7.	Existing glass block acceptable.
C159	9.10.13.8.	Existing sizes acceptable.
C160	9.10.13.9.	Existing operable latches acceptable.
C161	9.10.13.10.(1)	Existing functionally operable self-closing devices acceptable.
C162	9.10.13.11.	Existing operable self-releasing electromagnetic hold-open device acceptable, and except for *hotels*, fusible link hold-open devices acceptable.
C163	9.10.13.12.	Existing swings acceptable.
C164	9.10.13.13.(1)	In a *building* containing not more than four *dwelling units*, the existing heating or *air conditioning* system may be altered to serve more than one *dwelling unit* provided *smoke alarms* are installed in each *dwelling unit* and provided *a smoke detector is* installed in the supply or return air duct system serving the entire *building* which would turn off the fuel supply and electrical power to the heating system upon activation of such detector.
C165	9.10.13.13.(1)	In detached houses, semi-detached houses, townhouses and row houses containing not more than two *dwelling units*, existing acceptable.
C166	9.10.13.14.; 9.10.5.1.	In a *building* containing not more than four *dwelling units*, the existing heating or *air conditioning* system may be altered to serve more than one *dwelling unit* provided *smoke alarms* are installed in each *dwelling unit* and provided *a smoke detector is* installed in the supply or return air duct system serving the entire *building* which would turn off the fuel supply and electrical power to the heating system upon activation of such detector.
C167	9.10.5.1.	In detached houses, semi-detached houses, townhouses and row houses containing not more than two *dwelling units*, existing acceptable.
C168	9.10.14.4.; 9.10.15.4.	Existing windows. (a) Existing windows in walls may be relocated to another part of the wall, provided the existing opening is blocked up to provide the same fire rating for the wall, and the projection of the new opening, at a right angle to the property line onto another *building*, lies no closer than 300 mm from a window in such other *building*, where the "opposite" window is less than 2 400 mm from the opposite new opening, and (b) except relocation of units, to be restricted to the same *fire compartment* and shall conform to the requirements of Articles 3.2.3.13. or 9.10.12.3. where applicable, or (c) where a *building* does not satisfy the requirements of Subsection 3.2.3. for the amount of openings facing a yard or space that does not have sufficient *limiting distance*, such existing openings are allowed to be relocated provided: (i) such openings are not increased in size and they are protected with wired glass in steel frames conforming to Sentence 3.1.8.14.(2), or (ii) the *building* is *sprinklered*.
C169	9.10.14.2.(2) and (3); 9.10.14.4.(2); 9.10.15.2.(2) and (3); 9.10.15.4.(4)	Where an addition to an existing residential *building* has its *exposing building face* further distant from the line than the existing *exposing building face* and the *limiting distance* is at least 1 200 mm, the total area of allowable *unprotected openings* may be determined under Sentences 9.10.14.2.(2) or 9.10.15.2.(2) for the combined new and existing exposing *building faces*, and

COL. 1	COLUMN 2	COLUMN 3
		(a) where the existing *exposing building face* has no *unprotected openings*, or the existing *unprotected openings* are to be filled in, the total allowable area of *unprotected openings* may be installed in the new *exposing building face*, or (b) where the existing *unprotected openings* are to remain, their area shall be deducted from the total allowable area of *unprotected openings*, and the balance may be installed in the new *exposing building face*, and (c) Sentences 9.10.14.2.(3) and 9.10.14.4.(2) or Sentences 9.10.15.2.(3) and 9.10.15.4.(4) apply only to the new *exposing building face*.
C170	9.10.16.2.(1)	Where balloon framing is exposed during renovation, fire stopping shall be provided.
C171	9.10.18.	(a) Subject to approval by the *chief building official*, existing fire alarm system may remain where the Fire Safety Plan (as described in Subsection 2.8.2. of the Fire Code) for the *building* addresses the intent of Subsection 3.2.4. (i.e. "stage" system, electrical supervision, detection as required, Fire Department connection, and emergency power supply), and (b) extension of an existing system must ensure continuity and compatibility, and integrity of the system.
C172	9.10.19.3.	*Smoke alarms* may be battery operated.
C173	9.10.20.	Existing access acceptable.
C174	9.14.2.1.(2)	Existing acceptable.
C175	9.18.2.	Existing access acceptable.
C176	9.18.3.	Existing vents and ventilation acceptable.
C177	9.19.	Existing acceptable.
C178	9.20.2.2.	Used masonry may be reused for patching and filling openings to match adjacent work. Used interior brick may not be used for exterior applications.
C179	9.20.3.	Archaic mortars may be used to match existing jointing.
C180	9.20.4.1.	Sound jointing techniques may be employed to match existing archaic joints.
C181	9.20.12.1.	Corbelling may be constructed to match existing or original details, provided that it is structurally adequate for the proposed use.
C182	9.21.	Existing acceptable, provided the products of combustion are safely vented, and provided no fire hazard is created.
C183	9.22.1. to 9.22.7.	Sound period materials, designs and techniques may be employed in recreated fireplaces, provided no fire hazard is created. Article 9.22.1.4. need not comply.
C184	9.23.	Existing acceptable.
C185	9.24.	Existing acceptable.
C186	9.25.	A *vapour barrier* may consist of paint or other coating with specified perm rating such as two coats of leafing aluminum pigmented paint.
C187	9.26.	Existing acceptable, except when removing and replacing shingles, comply with the eave protection requirements of Subsection 9.26.5.
C188	9.27.	Existing acceptable.
C189	9.28.	All replacement or recreation of existing stucco may be compatible with the existing materials and application.
C190	9.29.4.	Existing acceptable. All replacement or recreation of existing plaster may be compatible with the existing materials and application.
C191	9.32.	In detached houses, semi-detached houses, townhouses and row houses containing not more than two *dwelling units*, rooms or spaces in *dwelling units* to be ventilated by natural means in accordance with Subsection 9.32.2. or by providing adequate mechanical ventilation.
C192	9.33.1.1.	In a *building* containing not more than four *dwelling units*, the existing heating or *air conditioning* system may be altered to serve more than one *dwelling unit* provided *smoke alarms* are installed in each *dwelling unit* and provided *a smoke detector is* installed in the supply or return air duct system serving the entire *building* which would turn off the fuel supply and electrical power to the heating system upon activation of such detectors.
C193	9.33.1.2.	Sound, used or antique *appliances* are acceptable, provided that: (a) visual examination shows no excessive weakening by corrosion or other damage, (b) no structural parts are missing, (c) no cracks are present in the components intended to support the *appliance* or enclose the fire, and (d) loading and ash removal door latches and hinges hold the door closed.
C194	9.33.4.3.(1)	Carbon monoxide detectors may be battery operated or plugged into an electrical outlet
C195	9.34.4.1.	Existing meter mounting devices need not be relocated to these requirements during renovations.
C196	9.34.4.3.	Existing overhead and underground supply need not be relocated to these requirements during renovation.

COL. 1	COLUMN 2	COLUMN 3
C197	9.34.4.4.; 9.34.4.5.	Existing acceptable.
C198	9.37.	Sound used materials shall be acceptable for reuse, subject to the following limitations: (a) visual examination shows no excessive weakening by holes, notches, nail splits or other damage, and (b) logs have not been subjected to termite infestation.
NUMBER	**PART 12 REQUIREMENTS**	**PART 11 COMPLIANCE ALTERNATIVE**
C199	12.3.1.2.(1)	Existing acceptable.
C200	12.3.2.	(a) Where the framing systems are being altered to match the existing framing, lesser amounts and extent of insulation and *vapour barrier* will be permitted. (b) Existing acceptable for Articles 12.3.2.5. and 12.3.2.7. (c) Existing previously occupied log houses that are dismantled and reconstructed are exempt from Article 12.3.2.9.

Table 11.5.1.1.D/E.
Compliance Alternatives for Business/Mercantile Occupancies

Forming Part of Article 11.5.1.1.

COL. 1	COLUMN 2	COLUMN 3
NUMBER	**PART 3 REQUIREMENTS**	**PART 11 COMPLIANCE ALTERNATIVE**
DE1	3.1.4.6.	Existing *heavy timber construction* acceptable where *construction* is within 90% of member sizes listed in Part 3.
DE2	3.1.5.2.; 3.1.5.3.; 3.1.5.4.; 3.1.5.6.	Existing acceptable.
DE3	3.1.5.7.; 3.1.5.8.; 3.1.5.9.; 3.1.5.10.	Except for exposed foamed plastics, existing acceptable. To match existing, materials may be added from on or off site.
DE4	3.1.5.15.; 3.1.5.16.; 3.1.5.17.; 3.1.5.21.; 3.1.4.23.	Existing acceptable.
DE5	3.1.7.1.	*Fire-resistance ratings* may also be used where they are based on: 1. Guideline on Fire Ratings of Archaic Materials and Assemblies, HUD No. 8. 2. Fire Endurance of Protected Steel Columns and Beams, DBR Technical Paper No. 194. 3. Fire Endurance of Unit Masonry Walls, DBR Technical Paper No. 207. 4. Fire Endurance of Light-Framed and Miscellaneous Assemblies, DBR Technical Paper No. 222.
DE6	3.1.7.5.(3)	Existing assemblies required to be of *noncombustible construction* may be supported by *combustible construction* having at least the same *fire-resistance rating* as that supported.
DE7	3.1.8.1.(2); 3.1.8.6.	Existing functional *closures* are acceptable and may be relocated within the same existing *fire separation*.
DE8	3.1.8.5.(2)	(a) Existing functional and sound doors in existing *buildings* that are either hollow metal or kalamein and containing wired glass at least 6 mm thick and conforming to Sentence 3.1.8.14.(2) are permitted in lieu of doors not required to exceed 45 min, (b) all existing functional and sound hollow doors which carry existing 1.5 h labels are acceptable in lieu of current 1.5 h labels and may contain wired glass panels not exceeding 0.0645 m², at least 6 mm thick and conforming to Sentence 3.1.8.14.(2), and (c) every fire door, window assembly or glass block used as a *closure* in a required *fire separation* shall be installed in conformance with good engineering practice.
DE9	3.1.8.7.; 3.1.8.9.	*Fire dampers* or *fire stop flaps* are not required to be installed in existing ducts at penetrations of existing *fire separations*.
DE10	3.1.8.10.(1)	For existing unlabelled doors in existing *buildings*, at least 45 mm solid core wood or metal clad are acceptable.
DE11	3.1.8.13.	Existing functionally operable latching devices, excluding draw bolts, are acceptable.
DE12	3.1.8.14.	Existing transoms or sidelights located in required *fire separations* may be retained if wired glass, at least 6 mm thick, is securely fixed to a wood frame of at least 50 mm thickness with steel stops. Operable transoms shall be fixed closed.
DE13	3.1.8.15.; 3.1.8.16.; 3.1.8.17.	Existing acceptable.
DE14	3.1.11.	Where the concealed space is being materially altered, smoke or heat detection in that space in lieu of firestops and tied into fire alarm system is acceptable.
DE15	3.2.2.17.(1)(b) and (c)	Existing sprinkler systems in 1 *storey buildings* need not comply.

COL. 1	COLUMN 2	COLUMN 3
DE16	3.2.3.	Existing windows. (a) Existing windows in walls may be relocated to another part of the wall, provided the existing opening is blocked up to provide the same fire rating for the wall, and the projection of the new opening, at a right angle to the property line onto another *building*, lies not closer than 300 mm from a window in such other *building*, where the "opposite" window is less than 2 400 mm from the opposite new opening, and (b) except relocation of units, shall be restricted to the same *fire compartment* and shall conform to the requirements of Articles 3.2.3.14. or 9.10.12.3. where applicable, or (c) where a *building* does not satisfy the requirements of Subsection 3.2.3. for the amount of openings facing a yard or space that does not have sufficient *limiting distance*, such existing openings are allowed to be relocated provided: (i) such openings are not increased in size and they are protected with wired glass in steel frames conforming to Sentence 3.1.8.14.(2), or (ii) the *building* is *sprinklered*.
DE17	3.2.4.	(a) Existing fire alarm system may remain except that Article 3.2.4.5. does not apply where the "Fire Safety Plan" (as described in Subsection 2.8.2. of the Fire Code) for the *building* addresses the intent of Subsection 3.2.4. (i.e. "stage" system, electrical supervision, detection as required, Fire Department connection, and emergency power supply), and (b) extension of an existing system must ensure continuity and compatibility, and integrity of the system.
DE18	3.2.5.1.; 3.2.5.2.	Existing acceptable.
DE19	3.2.5.3.	Existing access acceptable.
DE20	3.2.5.4.; 3.2.5.5.; 3.2.5.6.	Existing acceptable provided the building is sprinklered.
DE21	3.2.5.7.	Does not apply, except where a change in *major occupancy* occurs from a lesser *hazard index*.
DE22	3.2.5.13.	Existing sprinkler systems in existing *buildings* that do not conform to NFPA 13 may be altered, added to, or extended from the existing system without complying with NFPA 13, provided the system is operational and adequate with respect to coverage, water supply and controls, and provided the system is evaluated by a qualified designer.
DE23	3.2.6.	Reserved
DE24	3.2.9.	Does not apply to *buildings* 6 *storeys* and less. Does not apply to *sprinklered buildings*.
DE25	3.3.1.5.(1)(c); Tables 3.3.1.5.A. and 3.3.1.5.B.	In Column 2, maximum area of room or *suite* to be unlimited.
DE26	3.3.1.9.(1)	Existing width of *public corridors* of not less than 914 mm is acceptable.
DE27	3.3.1.10.; 3.3.1.11.	Existing door swings may remain in *heritage buildings*, existing or being restored, with no change in *major occupancy* and with *occupant load* no greater than 100.
DE28	3.3.1.12.	Existing doors acceptable, provided not less than 600 mm wide.
DE29	3.3.1.15.	Existing curved or spiral stairs acceptable.
DE30	3.3.1.16.	Existing non-conforming capacities of *access to exits* are acceptable, provided that: (a) the increase in *occupant load* is not greater than 15%, (b) the corridor *fire separations* are rated to Code, and (c) early warning systems are provided, or (d) there are sprinklers, plus *smoke alarms* in *suites*.
DE31	3.3.1.17.	Does not apply to *heritage buildings*.
DE32	3.3.1.18.	Existing stained, etched, bevelled, leaded or figured glass acceptable.
DE33	3.2.3.17.	Need not comply for "E" *occupancy*.
DE34	3.3.5.4.; 3.3.5.7.(3)	Need not comply where a gasketed door and self closer are provided in the existing *fire separation*.
DE35	3.4.1.4.	The following types of *exits* may also be used for *buildings* not over 6 *storeys* in *building height*: (a) Connected balconies, which connect across *firewalls*, or connect to another *exit*, or with access to grade. (b) Areas of refuge where fire service rescue is possible and that comply with Measure L of Sentences (4) to (10), (18), and (20)(a), (b) and (d) in Supplementary Standard SB-4.
DE36	3.4.1.8.	Existing stained, etched, bevelled, leaded or figured glass acceptable.
DE37	3.4.2.5.(1)	Existing travel distance acceptable where *floor area* is *sprinklered*.
DE38	3.4.3.2.(7)	Existing width of *exits* acceptable provided the *occupant load* in not more than 15% above the *exit* capacity.
DE39	3.4.3.4.	Existing acceptable.
DE40	3.4.3.5.	Existing headroom clearance of not less than 1 980 mm is acceptable.

COL. 1	COLUMN 2	COLUMN 3
DE41	3.4.4.1.	*Fire separations* of *exits* permitted in *buildings*: - 30 min, up to 3 *storeys* in *building height*; - 45 min, up to 6 *storeys* in *building height*; - 1 h, over 6 *storeys* in *building height*.
DE42	3.4.4.4.(7)	Existing washrooms opening directly into *exit* stairwell shall be separated from *exit* stairwell by a 45 min *closure*.
DE43	3.4.5.1.(2) and (7)	Existing illuminated legible *exit* signs are acceptable.
DE44	3.4.6.1.	Existing acceptable.
DE45	3.4.6.2.	Existing acceptable, if visually apparent.
DE46	3.4.6.3.(1) and (2)	Existing acceptable with rise no greater than 3.7 m.
DE47	3.4.6.3.(3) and (4)	Existing acceptable.
DE48	3.4.6.4.(2) to (8)	Existing acceptable.
DE49	3.4.6.5.(1) to (5)	Existing acceptable.
DE50	3.4.6.6.(1)	Existing acceptable.
DE51	3.4.6.7.; 3.4.6.8.	Existing acceptable.
DE52	3.4.6.9.(2) to (6)	Existing acceptable.
DE53	3.4.6.10.(1) and (2)	Existing acceptable.
DE54	3.4.6.11.	Existing acceptable in *public heritage buildings* or a change in *occupancy* with no increase in *occupant load*.
DE55	3.4.6.12.; 3.4.6.13.	Existing acceptable.
DE56	3.4.6.15.	Existing functionally operable panic hardware acceptable.
DE57	3.4.7.2.	*Combustible* fire escapes which are protected from fire in accordance with Sentence 3.2.3.13.(2) are permitted or may be reconstructed or recreated (as in the case of a *heritage building*.)
DE58	3.5.1.	Existing acceptable except where *building* is classified under Subsection 3.2.6.
DE59	3.6.2.1.(7)	Existing *fire separation* of not less than 30 min is acceptable
DE60	3.6.2.2.	Existing acceptable where explosion-resistant *construction* or venting is provided.
DE61	3.6.2.6.	Existing acceptable.
DE62	3.6.2.8.(1)	2 h *fire separation* acceptable.
DE63	3.6.3.1.(1) to (5)	45 min *fire separation* acceptable up to 6 *storeys*.
DE64	3.6.3.3.	(a) Where 2 h *fire separation* is required, 1 h is acceptable. (b) Where 1 h *fire separation* is required, 45 min is acceptable. (c) Existing need not comply with Sentence 3.6.3.3.(5).
DE65	3.6.4.2.	Ceiling *fire separation* need not be fire-resistance rated where sprinklering, subject to C.A. DE24, of *fire compartments* on both sides of vertical *fire separation* is provided and where such *fire separation* is not required to exceed 1 h.
DE66	3.6.4.3.(1)	Existing to meet *flame-spread rating* of 25 or to be *sprinklered*.
DE67	3.6.4.4.; 3.6.4.5.; 3.6.4.6.	Existing access acceptable.
DE68	3.7.4.	Where the *occupant load* is increased by more than 15% above the capacity of the existing facilities, facilities to be added to accommodate the increase.
DE69	3.8.1.2.	Existing accessible entrance acceptable. Existing curb ramp conforming to Sentence 3.8.3.2.(3) is acceptable.
DE70	3.8.1.3.(1)	Existing unobstructed width of 920 mm minimum is acceptable.
DE71	3.8.1.3.(4)	Existing unobstructed space not less than 1500 mm in width and 1500 mm in length located not more than 30 m apart is acceptable.
DE72	3.8.3.3.(1)	Existing doorway acceptable, provided not less than 810 mm wide.
DE73	3.8.3.4.(1)(a)	Existing ramp acceptable, provided not less than 870 mm between handrails.
DE74	3.8.3.8.(1)(d)(i)	Existing grab bar is acceptable.
DE75	3.8.3.13.(1)(f)	Existing grab bar is acceptable.
NUMBER	**PART 4 REQUIREMENTS**	**PART 11 COMPLIANCE ALTERNATIVE**
DE76	4.1.8.	The requirements under this Subsection do not apply.
NUMBER	**PART 6 REQUIREMENTS**	**PART 11 COMPLIANCE ALTERNATIVE**
DE77	6.2.2.1.(2)	Required outdoor air rates may be provided by mechanical, natural or combination of natural and mechanical means.
DE78	6.2.3.2.; 6.2.3.9.; 6.2.3.18; 6.2.3.19.	Existing acceptable.
DE79	6.2.3.13.	Existing openings, grilles and diffusers acceptable, subject to approval of *chief building official*.
DE80	6.2.4.2.(1); 6.2.4.3.(1) to (3) and (5)	Existing acceptable.
DE81	6.2.4.3.(10)	Where the duct system is being altered, lesser amounts and extent of insulation will be permitted.
DE82	6.2.9.2.	Existing acceptable.

Col. 1	Column 2	Column 3
NUMBER	**PART 8 REQUIREMENTS**	**PART 11 COMPLIANCE ALTERNATIVE**
DE83	8.2.1.4.	Existing clearances acceptable where: a *sewage system* is replaced with another *sewage system* within the same class; and, the capacity of the replacement *sewage system* does not exceed the capacity of the existing *sewage system*.
DE84	8.2.1.4.	Existing clearances are acceptable where a replacement *sewage system* requires lesser clearances than those required in Part 8 for the existing *sewage system*.
NUMBER	**PART 9 REQUIREMENTS**	**PART 11 COMPLIANCE ALTERNATIVE**
DE85	9.3.2.1.	Sound used lumber may be acceptable for reuse without a grade stamp provided that: (a) visual examination shows no excessive weakening by holes, notches, nail splits or other damage, (b) where the grade or species is unknown, the minimum grade shall apply for span table use, and (c) lumber has not been subjected to termite infestation.
DE86	9.6.3.2.	Except where required in Article 9.9.2.1.(4) existing acceptable, provided not less than 600 mm.
DE87	9.6.5.	Existing acceptable.
DE88	9.6.6.2.; 9.6.6.3.	Existing doors and sidelights being reused or relocated need not conform if identified or protected.
DE89	9.7.1.7.	Existing acceptable.
DE90	9.7.5.	Existing acceptable.
DE91	9.8.1. to 9.8.4.	Replacement or extension of existing stair systems shall be exempt from the provisions of these Articles, except that they shall have: (a) a minimum width between wall faces of 700 mm, and (b) a minimum clear height over tread nosing or landing of 1 800 mm.
DE92	9.8.3.2.	Existing acceptable.
DE93	9.8.4.4.	Existing curved or spiral stairs acceptable.
DE94	9.8.5.1.(2)	Existing ramps acceptable, where practical.
DE95	9.8.7.	Existing handrails acceptable, unless considered unsafe by *chief building official*.
DE96	9.8.8.	Existing *guards* acceptable, unless considered unsafe by *chief building official*.
DE97	9.9.1.1.	Existing acceptable.
DE98	9.9.2.1.(1) to (3)	The following types of *exits* may also be used: (a) connected balconies, which connect across *firewalls*, or connect to another *exit*, or with access to grade, (b) areas of refuge, approved by the *chief building official*, where fire service rescue is possible, or (c) *combustible* or *noncombustible* exterior stairways or fire escapes which are protected in accordance with Sentence 3.2.3.13.(2). These may be reconstructed or recreated (as in the case of a *heritage building*).
DE99	9.9.2.1.(4)	Existing acceptable.
DE100	9.9.3.2.	Existing width of *exits* acceptable.
DE101	9.9.3.3.	Existing width of *public corridors* of not less than 965 mm is acceptable.
NUMBER	**PART 9 REQUIREMENTS**	**PART 11 COMPLIANCE ALTERNATIVE**
DE102	9.9.3.4.	Existing clear height of not less than 1 950 mm is acceptable.
DE103	9.9.4.2.	30 min *fire separation* acceptable.
DE104	9.9.5.4.; 9.9.5.5.	Existing acceptable.
DE105	9.9.5.8.	Existing acceptable provided minimum 45 min *fire separation* and where explosion-resistant *construction* or venting is provided.
DE106	9.9.5.9.	Existing acceptable, provided that the enclosure has a 45 min *fire-resistance rating*.
DE107	9.9.6.1.	Existing acceptable.
DE108	9.9.6.2.	Existing clear opening height of not less than 1 950 mm is acceptable, with existing door heights to be acceptable.
DE109	9.9.6.3.	Existing door widths are acceptable, provided *exit* widths comply with C.A. DE101.
DE110	9.9.6.5.	Existing door swings are acceptable. Existing acceptable in *public heritage buildings*, where approved by *chief building official*.
DE111	9.9.6.6.(1)	Where *exit* doors open onto a landing, they shall not extend beyond the face of the first riser.
DE112	9.9.6.8.	Existing functionally operable passage or panic hardware acceptable.
DE113	9.9.7.4.	Maximum area of existing room or *suite* to be unlimited.
DE114	9.9.8.2.(1)	Existing travel distance acceptable where *floor area* is *sprinklered* and provided *fire separations* comply with Part 9.
DE115	9.9.10.6.	Existing illuminated legible signs are acceptable for *exit* signs, if approved by *chief building official*.

COL. 1	COLUMN 2	COLUMN 3
DE116	9.10.1.1.	Assemblies required to be of *noncombustible construction* may be supported by *combustible construction* having at least the same *fire-resistance rating* as that supported.
DE117	9.10.1.3.(8)	Existing installations acceptable subject to C.A.'s DE22 and DE24.
DE118	9.10.3.	*Fire-resistance ratings* may also be used where they are based on: 1. Guideline on Fire Ratings of Archaic Materials and Assemblies, HUD No. 8. 2. Fire Endurance of Protected Steel Columns and Beams, DBR Technical Paper No. 194. 3. Fire Endurance of Unit Masonry Walls, DBP. Technical Paper No. 207. 4. Fire Endurance of Light-Framed and Miscellaneous Assemblies, DBR Technical Paper No. 222.
DE119	9.10.5.1.	(a) Existing openings in existing wall or ceiling membranes to remain. (b) Existing openings may be moved to another location in the same wall or ceiling, provided the aggregate area of openings does not increase and are not cumulative, and the existing opening is blocked up to provide the same rating as the existing wall or ceiling assembly.
DE120	9.10.6.2.	Existing *heavy timber construction* acceptable where *construction* is within 90% of the member sizes listed in Part 3.
DE121	9.10.7.	Existing acceptable for *heritage buildings*, subject to approval of *chief building official*.
DE122	9.10.8.1.	Existing 30 min rating acceptable.
DE123	9.10.8.2.	Existing sprinkler systems complying with C.A. DE24 and Sentence 3.2.2.17.(1) are acceptable.
DE124	9.10.8.3.	Existing acceptable, subject to approval of the *chief building official*.
DE125	9.10.8.8.	30 min rating acceptable.
DE126	9.10.9.7.; 9.10.9.9.	Existing acceptable in existing *fire separations*.
DE127	9.10.9.10.(1)	Ceiling *fire separation* need not be fire-resistance rated where sprinklering of *fire compartments* on both sides of vertical *fire separation* is provided and where such *fire separation* is not required to exceed 1 h.
DE128	9.10.9.11.(2)	In lieu of the 2 h *fire separation*, sprinklers may be used in the *mercantile occupancy* with a 1 h *fire separation*.
DE129	9.10.9.13.	30 min *fire separation* acceptable.
DE130	9.10.9.15.(1)	30 min *fire separation* acceptable.
DE131	9.10.9.15.(3)	Need not comply for *mercantile occupancy*.
DE132	9.10.10.3.(1)	45 min *fire separation* acceptable.
DE133	9.10.13.1.	Existing functional *closures* are acceptable subject to C.A. DE8.
DE134	9.10.13.2.	Existing acceptable.
DE135	9.10.13.3.	Existing acceptable, provided that wood door frames are secured with hinge screws going through frame into the stud.
DE136	9.10.13.5.	Existing acceptable. Existing transoms or sidelights located in required *fire separations* may be retained if wired glass, at least 6 mm thick, is securely fixed to a wood frame of at least 50 mm thickness with steel stops. Operable transoms shall be fixed closed.
DE137	9.10.13.6.	Existing steel door frames acceptable.
DE138	9.10.13.7.	Existing glass block acceptable.
DE139	9.10.13.8.	Existing sizes acceptable.
DE140	9.10.13.9.	Existing operable latches acceptable.
DE141	9.10.13.10.(1)	Existing functionally operable self-closing device acceptable.
DE142	9.10.13.10.(2)	Existing functionally operable self-closing devices acceptable in "E" occupancy.
DE143	9.10.13.11.	Existing operable self-releasing electromagnetic and fusible link hold-open devices acceptable.
DE144	9.10.13.12.	Existing swings acceptable.
DE145	9.10.14.4.	Existing windows. (a) Existing windows in walls may be relocated to another part of the wall, provided the existing opening is blocked up to provide the same fire rating for the wall, and the projection of the new opening, at a right angle to the property line onto another *building*, lies no closer than 300 mm from a window in such other *building*, where the "opposite" window is less than 2 400 mm from the opposite new opening, and (b) except relocation of units, to be restricted to the same *fire compartment* and shall conform to the requirements of Articles 3.2.3.14. or 9.10.12.3. where applicable, or (c) where a *building* does not satisfy the requirements of Subsection 3.2.3. for the amount of openings facing a yard or space that does not have sufficient *limiting distance*, such existing openings are allowed to be relocated provided:

COL. 1	COLUMN 2	COLUMN 3
		(i) such openings are not increased in size and they are protected with wired glass in steel frames conforming to Sentence 3.1.8.14.(2), or (ii) the *building* is *sprinklered*.
DE146	9.10.16.2.(1)	Where balloon framing is exposed during renovation, fire stopping shall be provided.
DE147	9.10.18.	(a) Subject to approval by the *chief building official*, existing fire alarm system may remain where the Fire Safety Plan (as described in Subsection 2.8.2. of the Fire Code) for the *building* addresses the intent of 3.2.4. (i.e. "stage' system, electrical supervision, detection as required, Fire Department connection, and emergency power supply), and (b) extension of an existing system must ensure continuity and compatibility.
DE148	9.10.20.	Existing access acceptable.
DE149	9.18.2.	Existing access acceptable.
DE150	9.18.3.	Existing vents and ventilation acceptable.
DE151	9.19.	Existing acceptable.
DE152	9.20.2.2.	Used masonry may be reused for patching and filling openings to match adjacent work. Used interior brick may not be used for exterior applications.
DE153	9.20.3.	Archaic mortars may be used to match existing jointing.
DE154	9.20.4.1.	Sound jointing techniques may be employed to match existing archaic joints.
DE155	9.20.12.1.	Corbelling may be constructed to match existing or original details, provided that it is structurally adequate for the proposed use.
DE156	9.21.	Existing acceptable, provided the products of combustion are safely vented and provided no fire hazard is created.
DE157	9.22.1. to 9.22.7.	Sound period materials, designs and techniques may be employed in recreated fireplaces, provided no fire hazard is created. Existing need not comply with Article 9.22.1.4.
DE158	9.23.	Existing acceptable.
DE169	9.24.	Existing acceptable.
DE160	9.25.	Reserved
DE161	9.26.	Existing acceptable, except when removing and replacing shingles, comply with eave protection requirements in Subsection 9.26.5.
DE162	9.27.	Existing acceptable.
DE163	9.28.	All replacement or recreation of existing stucco may be compatible with the existing materials and application.
DE164	9.29.4.	Existing acceptable. All replacement or recreation of existing plaster may be compatible with the existing materials and application.
DE165	9.33.1.2.	Sound, used or antique *appliances* are acceptable, provided that: (a) visual examination shows no excessive weakening by corrosion or other damage, (b) no structural parts are missing, (c) no cracks are present in the components intended to support the *appliance* or enclose the fire, and (d) loading and ash removal door latches and hinges hold the door closed.
DE166	9.34.4.1.; 9.34.4.3.	Existing meter mounting devices and overhead and underground supply need not be relocated to these requirements during renovations.
DE167	9.34.4.4.; 9.34.4.5.	Existing acceptable.
DE168	9.37.	Sound used materials shall be acceptable for reuse, subject to the following limitations: (a) visual examination shows no excessive weakening by holes, notches, nail splits or other damage, and (b) logs have not be subjected to termite infestation.

Table 11.5.1.1.F.
Compliance Alternatives for Industrial Occupancies

Forming Part of Article 11.5.1.1.

COL. 1	COLUMN 2	COLUMN 3
NUMBER	**PART 3 REQUIREMENTS**	**PART 11 COMPLIANCE ALTERNATIVE**
F1	3.1.4.6.	Existing *heavy timber construction* acceptable where *construction* is within 90% of member sizes listed in Part 3.
F2	3.1.5.2.; 3.1.5.3.; 3.1.5.4.; 3.1.5.6.	Existing acceptable.
F3	3.1.5.7.; 3.1.5.8.; 3.1.5.9.; 3.1.5.10.	Except for exposed foamed plastics, existing acceptable for "F2" and "F3" *occupancies*. To match existing, materials may be added from on or off site.
F4	3.1.5.15.; 3.1.5.16.; 3.1.5.17.; 3.1.5.21.; 3.1.5.23.	Existing acceptable.

COL. 1	COLUMN 2	COLUMN 3
F5	3.1.7.1.	*Fire-resistance ratings* may also be used where they are based on: 1. Guideline on Fire Ratings of Archaic Materials and Assemblies, HUD No. 8. 2. Fire Endurance of Protected Steel Columns and Beams, DBR Technical Paper No. 194. 3. Fire Endurance of Unit Masonry Walls, DBR Technical Paper No. 207. 4. Fire Endurance of Light-Framed and Miscellaneous Assemblies, DBR Technical Paper No. 222.
F6	3.1.7.5.(3)	Existing assemblies required to be of *noncombustible construction* may be supported by *combustible construction* having at least the same *fire-resistance rating* as that supported.
F7	3.1.8.1.(2); 3.1.8.6.	Existing functional *closures* are acceptable and may be relocated within the same *fire separation*.
F8	3.1.8.5.(2)	(a) Existing functional and sound doors in existing *buildings* that are either hollow metal or kalamein and containing wired glass at least 6 mm (0.236 in) thick and conforming to Sentence 3.1.8.14.(2) are permitted in lieu of doors not required to exceed 45 min, (b) all existing functional and sound hollow metal or kalamein doors which carry existing 1.5 h labels are acceptable in lieu of current 1.5 h labels and may contain wired glass panels not exceeding 0.0645 m², at least 6 mm thick and conforming to Sentence 3.1.8.14.(2), and (c) every fire door, window assembly or glass block used as a *closure* in a required *fire separation* shall be installed in conformance with good engineering practice.
F9	3.1.8.7.; 3.1.8.9.	*Fire dampers* or *fire stop flaps* are not required to be installed in existing ducts at penetrations of existing *fire separations*.
F10	3.1.8.10.(1)	For existing unlabelled doors in existing *buildings*, at least 45 mm solid core wood or metal clad are acceptable.
F11	3.1.8.11.(1)	Existing functionally operable devices acceptable for "F2" and "F3" *occupancies*.
F12	3.1.8.13.	Existing functionally operable latching devices, excluding draw bolts, are acceptable.
F13	3.1.8.14.	Existing transoms or sidelights located in required *fire separations* may be retained if wired glass, at least 6 mm thick, is securely fixed to a wood frame of at least 50 mm thickness with steel stops. Operable transoms shall be fixed closed.
F14	3.1.8.15.; 3.1.5.16.; 3.1.8.17.	Existing acceptable.
F15	3.1.11.	Where the concealed space is being materially altered, smoke or heat detection in that space in lieu of firestops and tied into fire alarm system is acceptable.
F16	3.2.2.17.(1)(b) and (c)	Existing sprinkler systems in 1 *storey buildings* need not comply.
F17	3.2.3.	Existing need not comply with Article 3.2.3.18. For "F2" occupancy. Existing windows. (a) Existing windows in walls may be relocated to another part of the wall, provided the existing opening is blocked up to provide the same fire rating for the wall, and the projection of the new opening, at a right angle to the property line onto another *building*, lies not closer than 300 mm from a window in such other *building*, where the "opposite" window is less than 2 400 mm from the opposite new opening, and (b) except relocation of units, shall be restricted to the same *fire compartment* and shall conform to the requirements of Articles 3.2.3.14. or 9.10.12.3. where applicable, or (c) where a *building* does not satisfy the requirements of Subsection 3.2.3. for the amount of openings facing a yard or space that does not have sufficient *limiting distance*, such existing openings are allowed to be relocated provided: (i) such openings are not increased in size and they are protected with wired glass in steel frames conforming to Sentence 3.1.8.14.(2), or (ii) the *building* is *sprinklered*.
F18	3.2.3.17.	Need not comply for "F2" *occupancy*.
F19	3.2.4.	(a) Existing fire alarm system may remain except that Article 3.2.4.5. does not apply where the "Fire Safety Plan" (as described in Subsection 2.8.2. of the Fire Code) for the *building* addresses the intent of Subsection 3.2.4. (i.e. "stage" system, electrical supervision, detection as required, Fire Department connection, and emergency power supply), and (b) extension of an existing system must ensure continuity and compatibility, and integrity of the system.
F20	3.2.5.1; 3.2.5.2.	Existing acceptable.
F21	3.2.5.3.	Existing access acceptable.
F22	3.2.5.4.; 3.2.5.5.;3.2.5.6.	Existing acceptable provided the *building* is *sprinklered*.

COL. 1	COLUMN 2	COLUMN 3
F23	3.2.5.7.	Does not apply, except where a change in *major occupancy* occurs from a lesser *hazard index*.
F24	3.2.5.13.	Existing sprinkler systems in existing *buildings* that do not conform to NFPA 13 may be altered, added to, or extended from the existing system without complying with NFPA 13, provided the system is operational and adequate with respect to coverage, water supply and controls, and provided the system is evaluated by a qualified designer.
F25	3.2.6.	Reserved
F26	3.2.9.	May not apply to *buildings* 6 *storeys* and less of "F2" and "F3" *occupancies*. Does not apply to *sprinklered buildings*.
F27	3.3.1.4.(1)	30 min is acceptable to separate *public corridors* or *exits* in *buildings* not exceeding 6 *storeys* in *building height*, except that 45 min is required for *exits* in *buildings* exceeding 3 *storeys* in *building height*.
		Except for *exits*, no rating required where *floor areas* are *sprinklered*.
F28	3.3.1.5.(1)(c); Tables 3.3.1.5.A. and 3.3.1.5.B.	For "F2" and "F3" *occupancies* in Column 2, maximum area of room or *suite* to be unlimited.
F29	3.3.1.9.	Existing width of *public corridors* of not less than 914 mm is acceptable.
F30	3.3.1.9.(13) and (14)	Need not comply where connected balcony or area of refuge is provided complying with C.A. F37.
F31	3.3.1.10.; 3.3.1.11.	Existing door swings may remain in *heritage buildings*, existing or being restored, with no change in *major occupancy* and with *occupant load* no greater than 100.
F32	3.3.1.12.	Existing doors acceptable, provided not less than 600 mm wide.
F33	3.3.1.15.	Existing curved or spiral staircase acceptable.
F34	3.3.1.18.	Existing stained, etched, bevelled, leaded or figured glass acceptable.
F35	3.3.5.4.(2), (3), and (5)	Existing acceptable.
F36	3.3.5.6.; 3.3.5.7.	Need not comply where a gasketed door and self closer are provided in the existing *fire separation*.
F37	3.4.1.4.	For "F2" and "F3" *occupancies*, the following types of *exits* may also be used for *buildings* not over 6 *storeys* in *building height*: (a) connected balconies, which connect across firewalls, or connect to another *exit*, or with access to grade. (b) areas of refuge where fire service rescue is possible and that comply with Measure L in Sentences (4) to (10) and (20)(a), (b) and (d) in Supplementary Standard SB-4.
F38	3.4.1.8.	Existing stained, etched, bevelled, leaded or figured glass acceptable.
F39	3.4.2.5.(1)	For "F2" and "F3" *occupancies*, existing travel distance acceptable where the *floor area* is *sprinklered*.
F40	3.4.3.2.(7)	For "F2" and "F3" existing width of *exits* acceptable provided the *occupant load* in not more than 15% above the *exit* capacity.
F41	3.4.3.4.	Existing acceptable.
F42	3.4.3.5.	Existing headroom clearance of not less than 1 980 mm is acceptable.
F43	3.4.4.1.	*Fire separations* of *exits* permitted in *buildings*: - 30 min, up to 3 *storeys* in *building height*; - 45 min, up to 6 *storeys* in *building height*; - 1 h, over 6 *storeys* in *building height*.
F44	3.4.4.4.(7)	Existing washrooms opening directly into *exit* stairwell shall be separated from *exit* stairwell by 45 min *closure*.
F45	3.4.5.1.(2) and (7)	Existing illuminated legible *exit* signs are acceptable.
F46	3.4.6.1.	Existing acceptable.
F47	3.4.6.2.	Existing acceptable, if visually apparent.
F48	3.4.6.3.(1) and (2)	Existing acceptable with rise no greater than 3.7 m.
F49	3.4.6.3.(3) and (4)	Existing acceptable.
F50	3.4.6.4.(2) to (8)	Existing acceptable.
F51	3.4.6.5.(1) to (5)	Existing acceptable.
F52	3.4.6.6.(1)	Existing acceptable.
F53	3.4.6.7.; 3.4.6.8.	Existing acceptable.
F54	3.4.6.9.(2) to (6)	Existing acceptable.
F55	3.4.6.10.(1) and (2)	Existing acceptable.
F56	3.4.6.11.	For "F2" and "F3" existing acceptable in *public heritage buildings* or a change in *occupancy* with no increase in *occupant load*.
F57	3.4.6.12.; 3.4.6.13.	Existing acceptable.
F58	3.4.6.15.	Existing functionally operable panic hardware acceptable.
F59	3.4.7.2.	*Combustible* fire escapes which are protected from fire in accordance with Sentence 3.2.3.13.(2) are permitted or may be reconstructed or recreated (as in the case of a *heritage building*).

COL. 1	COLUMN 2	COLUMN 3
F60	3.5.1.	Existing acceptable, except where *building* classified under Subsection 3.2.6. and except where existing elevators are "open" type.
F61	3.6.2.1.(7)	45 min *fire separation* acceptable.
F62	3.6.2.2.	Existing acceptable where explosion-resistant *construction* or venting is provided.
F63	3.6.2.6.	Existing acceptable.
F64	3.6.2.8.(1)	2 h *fire separation* acceptable.
F65	3.6.3.1.(1) to (5)	45 min *fire separation* acceptable up to 6 *storeys*.
F66	3.6.3.3.	(a) Where 2 h *fire separation* is required, 1 h is acceptable. (b) Where 1 h *fire separation* is required, 45 min is acceptable. (c) Existing need not comply with Sentences 3.6.3.3.(4) and (5).
F67	3.6.4.2.	Ceiling *fire separation* need not be fire-resistance rated where sprinklering, subject to C.A. F24, of *fire compartments* on both sides of vertical *fire separation* is provided and where such *fire separation* is not required to exceed 1 h.
F68	3.6.4.3.(1)	Existing to meet *flame-spread rating* of 25 or to be *sprinklered*.
F69	3.6.4.4.; 3.6.4.5.; 3.6.4.6.	Existing access acceptable.
F70	3.7.4.	Where the *occupant load* is increased by more than 15% above the capacity of the existing facilities, facilities to be added to accommodate the increase.
F71	3.8.1.2.	Existing accessible entrance acceptable. Existing curb ramp conforming to Sentence 3.8.3.2.(3) is acceptable.
F72	3.8.1.3.(1)	Existing unobstructed width of 920 mm minimum is acceptable.
F73	3.8.1.3.(4)	Existing unobstructed space not less than 1500 mm in width and 1500 mm in length located not more than 30 m apart is acceptable.
F74	3.8.3.3.(1)	Existing doorway acceptable, provided not less than 810 mm wide.
F75	3.8.3.4.(1)(a)	Existing ramp acceptable, provided not less than 870 mm between handrails.
F76	3.8.3.8.(1)(d)(i)	Existing grab bar is acceptable.
F77	3.8.3.13.(1)(f)	Existing grab bar is acceptable.
F78	4.1.8.	The requirements under this Subsection do not apply.
NUMBER	**PART 6 REQUIREMENTS**	**PART 11 COMPLIANCE ALTERNATIVE**
F79	6.2.2.3.(1), (3), and (4)	*Storage garages* with a total capacity of fewer than 20 motor vehicles need not have mechanical ventilating systems if the downward slope of the floor to the outside door is 1 in 120 and the garage floor is above outside ground level.
F80	6.2.3.2.; 6.2.3.9.; 6.2.3.18; 6.2.3.19.	Existing acceptable for "F2" and "F3" *occupancies*.
F81	6.2.3.13.	Existing openings, grilles and diffusers acceptable.
F82	6.2.4.2.(1); 6.2.4.3.(1) to (3) and (5)	Existing acceptable.
F83	6.2.4.3.(10)	Where the duct system is being altered, lesser amounts and extent of insulation will be permitted.
F84	6.2.9.2.	Existing acceptable for "F2" and "F3" *occupancies*.
NUMBER	**PART 8 REQUIREMENTS**	**PART 11 COMPLIANCE ALTERNATIVE**
F85	8.2.1.4.	Existing clearances acceptable where: a *sewage system* is replaced with another *sewage system* within the same class; and, the capacity of the replacement *sewage system* does not exceed the capacity of the existing *sewage system*.
F86	8.2.1.4.	Existing clearances are acceptable where a replacement *sewage system* requires lesser clearances than those required in Part 8 for the existing *sewage system*.
NUMBER	**PART 9 REQUIREMENTS**	**PART 11 COMPLIANCE ALTERNATIVE**
F87	9.3.2.1.	Sound used lumber may be acceptable for reuse without a grade stamp provided that: (a) visual examination shows no excessive weakening by holes, notches, nail splits or other damage, (b) where the grade or species is unknown, the minimum grade shall apply for span table use, and (c) lumber has not been subjected to termite infestation.
F88	9.6.3.2.	Except where required in Article 9.9.2.1.(4) existing acceptable, provided not less than 600 mm.
F89	9.6.5.	Existing acceptable.
F90	9.6.6.2.; 9.6.6.3.	Existing doors and sidelights being reused or relocated need not conform if identified or protected.
F91	9.7.1.7.	Existing acceptable.
F92	9.7.5.	Existing barriers acceptable.
F93	9.8.1. to 9.8.4.	Replacement or extension of existing stair systems shall be exempt from the provisions of these Articles, except that they shall have: (a) a minimum width between wall faces of 700 mm, and (b) a minimum clear height over tread nosing or landing of 1 800 mm.
F94	9.8.4.4.	Existing curved or spiral stairs acceptable.
F95	9.8.5.1.(2)	Existing ramps acceptable, where practical.
F96	9.8.7.	Existing handrails acceptable, unless considered unsafe by *chief building official*.

COL. 1	COLUMN 2	COLUMN 3
F97	9.8.8.	Existing *guards* acceptable, unless considered unsafe by *chief building official*.
F98	9.8.9.6.(4)	Existing acceptable.
F99	9.9.1.1.	Existing acceptable.
F100	9.9.2.2.(1) to (3)	The following types of *exits* may also be used: (a) connected balconies, which connect across *firewalls*, or connect to another *exit*, or with access to grade, (b) areas of refuge approved by the *chief building official* where fire service rescue is possible, or (c) *combustible* or *noncombustible* exterior stairways or fire escapes which are protected in accordance with Sentence 3.2.3.13.(2). These may be reconstructed or recreated (as in the case of a *heritage building*).
F101	9.9.2.1.(4)	Existing acceptable.
F102	9.9.3.2.	Existing width of *exits* acceptable.
F103	9.9.3.3.	Existing width of *public corridors* of not less than 965 mm is acceptable.
F104	9.9.3.4.	Existing clear height of not less than 1 950 mm is acceptable.
F105	9.9.4.2.(1)	30 min *fire separation* acceptable.
F106	9.9.5.4.	Existing acceptable.
F107	9.9.5.8.	Existing acceptable provided minimum 45 min *fire separation* and where explosion-resistant *construction* or venting is provided.
F108	9.9.5.9.	Existing acceptable, provided that the enclosure has a 45 min *fire-resistance rating*.
F109	9.9.6.1.	Existing acceptable.
F110	9.9.6.2.	Existing clear opening height of not less than 1 950 mm is acceptable, with existing door heights to be acceptable.
F111	9.9.6.3.	Existing door widths are acceptable, provided *exit* widths comply with C.A. F103.
F112	9.9.6.5.	Existing door swings acceptable. Existing acceptable in *public heritage buildings*, where approved by *chief building official*.
F113	9.9.6.6.(1)	Where *exit* doors open onto a landing, such doors shall not extend beyond the face of the first riser.
F114	9.9.6.8.	Existing functionally operable passage or panic hardware acceptable.
F115	9.9.7.4.	Maximum area of existing room or *suite* does not apply.
F116	9.9.8.2.(1)	Existing travel distance acceptable where *floor area* is *sprinklered* and provided *fire separations* comply with Part 9.
F117	9.9.10.6.	Existing illuminated legible signs are acceptable for *exit* signs, if approved by *chief building official*.
F118	9.10.1.1.	Assemblies required to be of *combustible construction* may be supported by *combustible construction* having at least the same *fire-resistance rating* as that supported.
F119	9.10.1.3.(8)	Existing acceptable subject to C.A.'s F24 and F26.
F120	9.10.3.	*Fire-resistance ratings* may also be used where they are based on: 1. Guideline on Fire Ratings of Archaic Materials and Assemblies, HUD No. 8. 2. Fire Endurance of Protected Steel Columns and Beams, DBR Technical Paper No. 194. 3. Fire Endurance of Unit Masonry Walls, DBR Technical Paper No. 207. 4. Fire Endurance of Light-Framed and Miscellaneous Assemblies, DBR Technical Paper No. 222.
F121	9.10.5.1.	Existing openings in existing wall or ceiling membranes to remain. Existing openings may be moved to another location in the same wall or ceiling, provided the aggregate area of openings does not increase and are not cumulative, and the existing opening is blocked up to provide the same rating as the existing wall or ceiling assembly.
F122	9.10.6.2.	Existing *heavy timber construction* acceptable where *construction* is within 90% of the member sizes listed in Part 3.
F123	9.10.7.	Existing acceptable for *heritage buildings*, subject to approval of *chief building official*.
F124	9.10.8.1.	Existing 30 min rating acceptable.
F125	9.10.8.2.	Existing sprinkler systems complying with C.A. F24 and Sentence 3.2.2.17.(1) are acceptable.
F126	9.10.8.3.	Existing acceptable, subject to approval of *chief building official*.
F127	9.10.8.8.	30 min rating acceptable.
F128	9.10.9.7.; 9.10.9.9.	Existing acceptable in existing *fire separations*.
F129	9.10.9.10.(1)	Ceiling *fire separation* need not be fire-resistance rated where sprinklering of *fire compartments* on both sides of vertical *fire separation* is provided and where such *fire separation* is not required to exceed 1 h.

COL. 1	COLUMN 2	COLUMN 3
F130	9.10.9.11.(2)	In lieu of the 2 h *fire separation*, sprinklers may be used in the *medium hazard industrial occupancy* with a 1 h *fire separation*.
F131	9.10.9.13.; 9.10.9.15.(1)	30 min *fire separation* acceptable.
F132	9.10.10.3.(1)	45 min *fire separation* acceptable.
F133	9.10.13.1.	Existing functional *closures* are acceptable subject to C.A. F8.
F134	9.10.13.2.	Existing acceptable.
F135	9.10.13.3.	Existing acceptable, provided that wood door frames are secured with hinge screws going through frame into the stud.
F136	9.10.13.5.	Existing wired glass acceptable. Existing transoms or sidelights located in required *fire separations* may be retained if wired glass, at least 6 mm thick, is securely fixed to a wood frame of at least 50 mm thickness with steel stops. Operable transoms shall be fixed closed.
F137	9.10.13.6.	Existing steel door frames acceptable.
F138	9.10.13.7.	Existing glass block acceptable.
F139	9.10.13.8.	Existing sizes acceptable.
F140	9.10.13.9.	Existing operable latches acceptable.
F141	9.10.13.10.(1)	Existing operable self-closing devices acceptable.
F142	9.10.13.11.	Existing operable self-releasing electromagnetic and fusible link hold-open devices acceptable.
F143	9.10.13.12.	Existing swings acceptable.
F144	9.10.14.4.	Existing windows. (a) Existing windows in walls may be relocated to another part of the wall, provided the existing opening is blocked up to provide the same fire rating for the wall, and the projection of the new opening, at a right angle to the property line onto another *building*, lies no closer than 300 mm from a window in such other *building*, where the "opposite" window is less than 2 400 mm from the opposite new opening, and (b) except relocation of units, to be restricted to the same *fire compartment* and shall conform to the requirements of Articles 3.2.3.14. or 9.10.12.3. where applicable, or (c) where a *building* does not satisfy the requirements of Subsection 3.2.3. for the amount of openings facing a yard or space that does not have sufficient *limiting distance*, such existing openings are allowed to be relocated provided: (i) such openings are not increased in size and they are protected with wired glass in steel frames conforming to Sentence 3.1.8.14.(2), or (ii) the *building* is *sprinklered*.
F145	9.10.16.2.(1)	Where balloon framing is exposed during renovation, fire stopping shall be provided.
F146	9.10.18.	(a) Subject to approval by the *chief building official*, existing fire alarm system may remain where the Fire Safety Plan (as described in Subsection 2.8.2. of the Fire Code) for the *building* addresses the intent of Subsection 3.2.4. (i.e. "stage" system, electrical supervision, detection as required, Fire Department connection, and emergency power supply), and (b) extension of an existing system must ensure continuity and compatibility, and integrity of the system.
F147	9.10.20.	Existing access acceptable.
F148	9.18.2.	Existing access acceptable.
F149	9.18.3.	Existing vents and ventilation acceptable.
F150	9.19.2.1.	Existing access acceptable.
F151	9.20.2.2.	Used masonry may be reused for patching and filling openings to match adjacent work. Used interior brick may not be used for exterior applications.
F152	9.20.3.	Archaic mortars may be used to match existing jointing.
F153	9.20.4.1.	Sound jointing techniques may be employed to match existing archaic joints.
F154	9.20.12.1.	Corbelling may be constructed to match existing or original details, provided that it is structurally adequate for the proposed use.
F155	9.21.	Existing acceptable, provided the products of combustion are safely vented and provided no fire hazard is created.
F156	9.22.1. to 9.22.7.	Sound period materials, designs and techniques may be employed in recreated fireplaces provided no fire hazard is created. Existing need not comply with Article 9.22.1.4.
F157	9.23.	Existing acceptable.
F158	9.24.	Existing acceptable.
F159	9.25.	Reserved
F160	9.26.	Existing acceptable.
F161	9.27.	Existing acceptable.

COL. 1	COLUMN 2	COLUMN 3
F162	9.28.	All replacement or recreation of existing stucco may be compatible with the existing materials and application.
F163	9.29.4.	Existing acceptable. All replacement or recreation of existing plaster may be compatible with the existing materials and application.
F164	9.33.1.2.	Sound, used or antique *appliances* are acceptable, provided that: (a) visual examination shows no excessive weakening by corrosion or other damage, (b) no structural parts are missing, (c) no cracks are present in the components intended to support the *appliance* or enclose the fire, and (d) loading and ash removal door latches and hinges hold the door closed.
F165	9.34.4.1.; 9.34.4.3.	Existing meter mounting devices and overhead and underground supply need not be relocated to these requirements during renovations.
F166	9.34.4.4.; 9.34.4.5.	Existing acceptable.
F167	9.37.	Sound used materials shall be acceptable for reuse, subject to the following limitations: (a) visual examination shows no excessive weakening by holes, notches, nail splits or other damage, and (b) logs have not been subjected to termite infestation.

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PART 12
RESOURCE CONSERVATION

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Section 12.1. General

12.1.1. Application

12.1.1.1. Scope

(1) The scope of this Part shall be as described in Subsection 1.1.2. of Division A.

12.1.1.2. Application

(1) This Part applies to resource conservation in the design and *construction of buildings*.

Section 12.2. Energy Efficiency

12.2.1. General

12.2.1.1. Energy Efficiency Design

(1) Sentences (2) to (5) apply to *construction* for which a permit has been applied for before January 1, 2012.

(2) Except as provided in Sentences (3) and (5) and permitted in Sentence (4), the energy efficiency of all *buildings* shall be designed to good engineering practice such as described in,

(a) the ANSI/ASHRAE/IESNA 90.1, "Energy Efficient Design of New Buildings Except Lowrise Residential Buildings" and Supplementary Standard SB-10, or

(b) the Model National Energy Code for Buildings and Supplementary Standard SB-10.

(3) The energy efficiency of a *building* or part of a *building* of *residential occupancy* that is within the scope of Part 9 and is intended for *occupancy* on a continuing basis during the winter months shall,

(a) conform to the thermal insulation requirements of Subsection 12.3.2.,

(b) conform to the thermal design requirements of Subsection 12.3.3., or

(c) provide a rating of 80 or more when evaluated in accordance with NRCan "EnerGuide for New Houses: Administrative and Technical Procedures"

(4) The energy efficiency of a *building* or part of a *building* may conform to the design requirements of Subsection 12.3.4. if the *building* or part of the *building*,

(a) is within the scope of Part 9,

(b) does not contain a *residential occupancy*,

(c) does not use *electric space heating*, and

(d) is intended for *occupancy* on a continuing basis during the winter months.

(5) Sentence (1) does not apply to,

(a) *farm buildings*, and

(b) *buildings* intended primarily for manufacturing or commercial or industrial processing.

12.2.1.2. Energy Efficiency Design After December 31, 2011

(1) Sentences (2) to (5) apply to *construction* for which a permit has been applied for after December 31, 2011.

(2) Except as provided in Sentences (3) and (5), the energy efficiency of all *buildings* shall be designed to exceed by not less than 25% the energy efficiency levels attained by conforming to the Model National Energy Code for Buildings.

(3) The energy efficiency of a *building* or part of a *building* of *residential occupancy* that is within the scope of Part 9 and is intended for *occupancy* on a continuing basis during the winter months shall meet the performance level that is equal to a rating of 80 or more when evaluated in accordance with NRCan "EnerGuide for New Houses: Administrative and Technical Procedures".

(4) Reserved

(5) Sentence (1) does not apply to,

(a) *farm buildings*, and

(b) *buildings* intended primarily for manufacturing or commercial or industrial processing.

12.2.2. Motion Sensors

12.2.2.1. Motion Sensors

(1) Lighting installed to provide the minimum illumination levels required by this Code may be controlled by motion sensors except where the lighting

(a) is installed in an *exit*,

(b) is installed in a corridor serving patients or residents in a Group B, Division 2 or Division 3 *occupancy*, or

(c) is required to conform to Sentence 3.2.7.1.(5).

(2) Where motion sensors are used to control minimum lighting in a *public corridor* or corridor providing *access to exit* for the public, the motion sensors shall be installed with switch controllers equipped for fail-safe operation and illumination timers set for a minimum 15-minute duration.

(3) A motion sensor shall not be used to control emergency lighting.

Section 12.3. Energy Efficiency for Buildings Within the Scope of Part 9

12.3.1. General

12.3.1.1. Application

(1) Except as provided in Sentence (2), this Section applies to the energy efficiency of *buildings* within the scope of Part 9 intended for *occupancy* on a continuing basis during the winter months.

(2) This Section does not apply to,

(a) *farm buildings*, and

(b) areas of *buildings* intended primarily for manufacturing or commercial or industrial processing.

12.3.1.2. Equipment Efficiency for Buildings of Residential Occupancy

(1) The minimum annual fuel utilization efficiency of a *furnace* serving a *building* of *residential occupancy* shall conform to Table 12.3.1.2.

Table 12.3.1.2.
Furnace Minimum Annual Fuel Utilization Efficiency

Forming Part of Sentence 12.3.1.2.(1)

COLUMN 1	COLUMN 2
Furnace Fuel Source	Minimum Annual Fuel Utilization Efficiency
Natural gas	90%
Propane	90%
Oil	-

12.3.1.3. Residential Windows and Sliding Glass Doors

(1) The energy rating and the overall coefficient of heat transfer required for windows and sliding glass doors in a *residential occupancy* shall be determined in conformance with CAN/CSA-A440.2, "Energy Performance Evaluation of Windows and Sliding Glass Doors".

12.3.2. Thermal Insulation for Buildings of Residential Occupancy

12.3.2.1. Required Insulation

(1) All walls, ceilings, floors, windows and doors that separate heated space from unheated space, the exterior air or the exterior *soil* shall have thermal resistance ratings conforming to this Subsection.

(2) Insulation shall be provided between heated and unheated spaces and between heated spaces and the exterior, and around the perimeter of concrete slabs-on-ground.

(3) Reflective surfaces of insulating materials shall not be considered in calculating the thermal resistance of *building* assemblies.

(4) Except as permitted in Articles 12.3.2.3., 12.3.2.4., 12.3.2.6., 12.3.2.7. and 12.3.2.9., the minimum thermal resistance of insulation shall conform to Table 12.3.2.1.

Table 12.3.2.1.
Minimum Thermal Resistance of Insulation to be Installed Based on Degree-Day Zones(1)

Forming Part of Sentence 12.3.2.1.(4)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
Building Element Exposed to the Exterior or to Unheated Space	Minimum RSI Value Required		
	Zone 1 Less than 5000 degree-days	Zone 2 5000 or more degree-days	Electric Space Heating Zones 1 & 2
Ceiling below *attic or roof space*	7.00	7.00	8.80
Roof assembly without *attic or roof space*	4.93	4.93	4.93
Wall other than *foundation* wall	3.34	4.22	5.10
Foundation walls enclosing heated space	2.11	2.11	3.34
Floor, other than slab-on-ground	4.40	4.40	4.40
Slab-on-ground containing heating pipes, tubes, ducts or cables	1.76	1.76	1.76
Slab-on-ground not containing heating pipes, tubes, ducts or cables	1.41	1.41	1.76
Basement floor slabs located more than 600 mm below grade	—	—	—

Notes to Table 12.3.2.1.:

(1) Number of degree-days for individual locations are contained in Supplementary Standard SB-1.

12.3.2.2. Elements Acting as a Thermal Bridge

(1) Except for a *foundation* wall, the insulated portion of a wall that incorporates wood stud framing elements that have a thermal resistance of less than RSI 0.90 shall be insulated to restrict heat flow through the studs by a material providing a thermal resistance at least equal to 25 per cent of the thermal resistance required for the insulated portion of the assembly in Sentence 12.3.2.1.(4).

(2) Except as provided in Sentence (3), the thermal resistance of the insulated portion of a *building* assembly in Sentence 12.3.2.1.(4) that incorporates metal framing elements, such as steel studs and steel joists, that act as thermal bridges to facilitate heat flow through the assembly, shall be 20 per cent greater than the values shown in Table 12.3.2.1., unless it can be shown that the heat flow is not greater than the heat flow through a wood frame assembly of the same thickness.

(3) Sentence (2) does not apply to *building* assemblies incorporating thermal bridges where the thermal bridges are insulated to restrict heat flow through the thermal bridges by a material providing a thermal resistance at least equal to 25 per cent of the thermal resistance required for the insulated portion of the assembly in Sentence 12.3.2.1.(4).

12.3.2.3. Thermal Resistance Values for Roof and Ceiling Assemblies

(1) The thermal resistance values in Table 12.3.2.1. for exposed roofs or ceilings may be reduced near eaves to the extent made necessary by the roof slope and required ventilation clearances, except that the thermal resistance of insulation at the location directly above the inner surface of the exterior wall shall be at least RSI 2.1.

12.3.2.4. Insulation of Foundation Walls

(1) Sentence (2) applies to *construction* for which a permit has been applied for before January 1, 2009.

(2) *Foundation* walls enclosing heated space shall be insulated from the underside of the subfloor to not less than 600 mm below the adjacent exterior ground level.

(3) Sentence (4) applies to *construction* for which a permit has been applied for after December 31, 2008.

(4) *Foundation* walls enclosing heated space shall be insulated from the underside of the subfloor to not more than 380 mm above the finished floor level of the *basement*.

(5) The insulation required by Sentences (2) and (4) may be provided by a system installed,

(a) on the interior of the *foundation* wall,

(b) on the exterior face of the *foundation* wall, or

(c) partially on the interior and partially on the exterior, provided the thermal performance of the system is equivalent to that permitted in Clauses (a) or (b).

(6) Insulation around concrete slabs-on-ground shall extend not less than 600 mm below exterior ground level.

(7) The minimum RSI value required in Table 12.3.2.1. for the perimeter of a slab-on-ground is permitted to be reduced by 50% if the underside of the entire slab-on-ground is insulated.

(8) If a *foundation* wall is constructed of hollow masonry units, one or more of the following shall be used to control convection currents in the core spaces,

(a) filling the core spaces,

(b) at least one row of semi-solid blocks at or below *grade*, or

(c) other similar methods.

(9) Masonry walls of hollow units that penetrate the ceiling shall be sealed at or near the ceiling adjacent to the roof space to prevent air within the voids from entering the *attic or roof space* by,

(a) capping with masonry units without voids, or

(b) installation of flashing material extending across the full width of the masonry.

12.3.2.5. Enclosed Unheated Space

(1) Where an enclosed unheated space is separated from a heated space by glazing, the unheated enclosure may be considered to provide a thermal resistance of RSI 0.16.

12.3.2.6. Thermal Resistance of Windows

(1) Except as permitted in Sentence (2), all windows that separate heated space from unheated space shall have,

(a) an overall coefficient of heat transfer of not more than 2.0 W/ $m^2 \cdot °C$, or

(b) an energy rating of not less than,

  (i) 17 for operable windows, and

  (ii) 27 for fixed windows.

(2) A *basement* window that incorporates a *loadbearing* structural frame shall be double glazed with a low-E coating.

12.3.2.7. Minimum Thermal Resistance of Doors

(1) Except for doors on enclosed unheated vestibules and cold cellars, and except for glazed portions of doors, all doors that separate heated space from unheated space shall have a thermal resistance of not less than RSI 0.7 where a storm door is not provided.

(2) All sliding glass doors that separate heated space from unheated space shall have

(a) an overall coefficient of heat transfer of not more than 2.0 W/ m²·°C, or

(b) an energy rating of not less than 17.

12.3.2.8. Doors and Glazing With Electric Space Heating

(1) When *electric space heating* is used in a *dwelling unit*, all sliding glass doors that separate heated space from unheated space or the outdoors shall have,

(a) an overall coefficient of heat transfer of not more than 1.6 W/ m²·°C, or

(b) an energy rating of not less than 25.

(2) When *electric space heating* is used in a *dwelling unit*, all windows that separate heated space from unheated space or the outdoors shall have,

(a) an overall coefficient of heat transfer of not more than 1.6 W/ m²·°C, or

(b) an energy rating of not less than,

(i) 25 for operable windows, and

(ii) 35 for fixed windows.

12.3.2.9. Log Wall Construction and Post, Beam and Plank Construction

(1) Except as provided in Sentences (2) and (3), log wall construction and post, beam and plank construction shall have a minimum thermal resistance of RSI 2.1 for the total assembly.

(2) The thermal resistance value in Sentence (1) for the total wall assembly may be reduced to not less than RSI 1.61 if,

(a) the thermal resistance of insulation for the exposed roof or ceiling required in Table 12.3.2.1. is increased by an amount equivalent to the reduction permitted in this Sentence, and

(b) for log walls, the logs have tongue-and-groove or splined joints.

(3) Where milled log walls are installed, the thermal resistance value in Sentence (1) for the total wall assembly does not apply if,

(a) the mean thickness of each log is not less than 150 mm,

(b) the thermal resistance of insulation for the exposed roof or ceiling required in Table 12.3.2.1. is increased by RSI 0.53, and

(c) the logs have tongue-and-groove or splined joints.

12.3.3. Thermal Design for Buildings of Residential Occupancy Within the Scope of Part 9

12.3.3.1. Application

(1) This Subsection applies to the thermal design of *buildings* to which clause 12.2.1.1.(3)(b) applies.

12.3.3.2. General Requirements

(1) The materials for, and the installation of, thermal insulation and *vapour barrier* protection shall conform to Section 9.25.

(2) Foamed plastic thermal insulation shall be protected as described in Article 9.10.17.10.

(3) Crawl spaces shall conform to Section 9.18.

(4) Roof spaces shall conform to Section 9.19.

(5) Ventilation requirements shall conform to Section 9.32.

(6) Heating and *air-conditioning* requirements shall conform to Section 9.33.

12.3.3.3. Thermal Resistance

(1) Except as provided in Articles 12.3.3.4. to 12.3.3.8., and except for doors, windows, skylights and other closures, the thermal resistance of each *building* assembly through any portion that does not include framing or furring shall conform to Table 12.3.3.3.

Table 12.3.3.3.
Minimum Thermal Resistance of Building Assemblies Based on Degree-Day Zones

Forming Part of Sentence 12.3.3.3.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
Building Assembly	Minimum RSI Value Required		
	Less than 5000 degree-days	Zone 2 5000 or more degree-days	*Electric Space Heating* Zones 1 & 2
Ceiling below *attic or roof space*	7.24	7.24	9.00
Roof assembly without *attic or roof space*	5.21	5.21	5.21
Wall other than *foundation* wall	3.80	4.67	5.55
Foundation walls enclosing heated space	2.40	2.40	3.63
Floor, other than slab-on-ground	4.70	4.70	4.70
Slab-on-ground containing heating pipes, tubes, ducts or cables(1)	2.11	2.11	2.11
Slab-on-ground not containing heating pipes, tubes, ducts or cables(1)	1.76	1.76	2.11
Basement floor slabs located more than 600 mm below grade	—	—	—

Notes to Table 12.3.3.3.:

(1) "RSI value" shown for slab-on-ground is for rigid insulation.

12.3.3.4. Metal Framing Elements Acting as Thermal Bridge

(1) Except as provided in Article 12.3.3.5., the thermal resistance of the insulated portion of a *building* assembly that incorporates metal framing elements, such as steel studs and steel joists, that act as thermal bridges to facilitate heat flow through the assembly, shall be 20 per cent greater than the values shown in Table 12.3.3.3., unless it can be shown that the heat flow is not greater than the heat flow through a wood frame assembly of the same thickness.

12.3.3.5. Insulated Thermal Bridges

(1) Article 12.3.3.4. does not apply for *building* assemblies incorporating thermal bridges where the thermal bridges are insulated to restrict heat flow through the thermal bridges by a material providing a thermal resistance at least equal to 25 per cent of the thermal resistance required for the insulated portion of the assembly in Article 12.3.3.3.

12.3.3.6. Reduction of Thermal Resistance

(1) The thermal resistance of a *building* assembly may be reduced by not more than 20 per cent from that required in Articles 12.3.3.3. and 12.3.3.4., and the amount of glazing may be increased to more than permitted in Sentence 12.3.3.11.(2), where it can be shown that the total calculated heat loss from the *building* enclosure does not exceed the heat loss that would result if the enclosure were constructed in conformance with the minimum thermal resistance requirements in Articles 12.3.3.3. and 12.3.3.4. and with the maximum amount of glazing permitted in Sentence 12.3.3.11.(2), provided no allowance is made for solar heat gains or for the orientation of the glazing as described in Sentence 12.3.3.11.(4).

12.3.3.7. Thermal Resistance Values for Roof and Ceiling Assemblies

(1) The thermal resistance values in Articles 12.3.3.3. and 12.3.3.4. for roof or ceiling assemblies that separate heated space from unheated space or the exterior may be reduced near the eaves to the extent made necessary by the roof slope and required ventilation clearances, except that the thermal resistance at the location directly above the inner surface of the exterior wall shall be at least 2.1 $\text{m}^2\cdot{}^\circ\text{C/W}$.

12.3.3.8. Reduction in Thermal Resistance Values due to Thermal Inertia

(1) The thermal resistance values required in Article 12.3.3.3. may be reduced to take into account the effect of thermal inertia resulting from the mass of the *building* in conformance with DBR Building Research Note No. 126, "Relation Between Thermal Resistance and Heat Storage in Building Enclosures".

12.3.3.9. Foundation Wall Insulation

(1) Sentence (2) applies to *construction* for which a permit has been applied for before January 1, 2009.

(2) *Foundation* walls enclosing heated space shall be insulated from the underside of the subfloor to not less than 600 mm below the adjacent exterior ground level.

(3) Sentence (4) applies to *construction* for which a permit has been applied for after December 31, 2008.

(4) *Foundation* walls enclosing heated space shall be insulated from the underside of the subfloor to not more than 380 mm above the finished floor level of the *basement*.

(5) Insulation applied to the exterior of a slab-on-ground floor shall extend down at least 600 mm below the adjacent exterior ground level or shall extend down and outward from the floor or wall for a total distance of at least 600 mm measured from the adjacent finished ground level.

12.3.3.10. Enclosed Unheated Space

(1) Where an enclosed unheated space, such as a sun porch, enclosed verandah or vestibule, is separated from a heated space by glazing, the unheated enclosure may be considered to provide thermal resistance of 0.16 $m^2 \cdot °C/W$, or the equivalent of one layer of glazing.

12.3.3.11. Windows and Glazing

(1) Except as provided in Sentences (2) and (3), windows and all glazing that separates heated space from unheated space or the exterior shall conform to Articles 12.3.2.6. and 12.3.2.8.

(2) Except as provided in Sentences (3) and (4), the total area of glazing, including glazing for doors and skylights, that separates heated space from unheated space or the exterior shall not exceed 20 per cent of the *floor area* of the *storey* served by the glazed areas and shall not exceed 40 per cent of the total area of the walls of that *storey* that separates heated space from unheated space or the exterior. (In the case of a sloping wall, the area of the opaque portion of the wall is calculated as its projected area on a vertical plane.)

(3) Where the thermal resistance of glazing is different from that required in Sentence (1) and Article 12.3.3.10., the area of such glazing for the purpose of applying Sentence (2) may be assumed as being equal to the actual area multiplied by the ratio of the required thermal resistance divided by the actual thermal resistance of the glazing.

(4) Except as provided in Sentence (5), the area of glazing that contains clear glass or that has a shading coefficient of more than 0.70 that is unshaded in the winter and faces a direction within 45° of due South may be assumed to be 50 per cent of its unshaded area in calculating the maximum area of glazing in Sentences (2) and (3) provided the *building* is designed with a system that is capable of distributing the solar heat gain from such glazed areas throughout the *building*. For the purpose of determining whether or not the glazing is shaded in the winter, the shading shall be calculated using the noon sun angles of December 21.

(5) Sentence (4) shall not apply where the *building* is designed to be cooled unless the glazing described in Sentence (4) is shaded in the summer with exterior devices. For the purpose of determining whether or not the glazing is shaded in the summer, the shading shall be calculated using the noon sun angles of June 21.

12.3.3.12. Doors

(1) Air curtains shall not be used in place of exterior doors.

(2) Except for doors used primarily to facilitate the movement of vehicles or handling of material, infiltration around doors shall conform to the appropriate requirements in Article 12.3.3.13.

(3) Except for doors on enclosed unheated vestibules, all doors that separate heated space from the outside shall conform to Articles 12.3.2.7. and 12.3.2.8.

12.3.3.13. Air Infiltration

(1) Windows that separate heated space from unheated space or the exterior shall be designed to limit the rate of air infiltration to not more than 0.775 L/s for each metre of sash crack when tested at pressure differential of 75 Pa in conformance with ASTM E283, "Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen".

(2) Manually operated exterior sliding glass door assemblies that separate heated space from unheated space or the exterior shall be designed to limit air infiltration to not more than 2.5 L/s for each square metre of door area when tested in conformance with Sentence (1).

(3) Except where the door is weather-stripped on all edges and protected with a storm door or by an enclosed unheated space, exterior swing type door assemblies for *dwelling units*, individually rented *hotel* rooms and *suites* shall be designed to limit the rate of air infiltration to not more than 6.35 L/s for each square metre of door area when tested in conformance with Sentence (1).

(4) Door assemblies other than those described in Sentences (2) and (3), that separate heated space from unheated space or the exterior shall be designed to limit the rate of air infiltration to not more than 17.0 L/s for each metre of door crack when tested in conformance with Sentence (1).

(5) Caulking material to reduce air infiltration shall conform to the requirements in Subsection 9.27.4.

(6) The junction between the sill plate and the *foundation*, joints between exterior wall panels and any other location where there is a possibility of air leakage into heated spaces in a *building* through the exterior walls, such as at utility service entrances, shall be caulked, gasketed or sealed to restrict such air leakage.

(7) Air leakage between heated space and adjacent roof or attic space caused by the penetration of services shall be restricted in conformance with the requirements of Subsection 9.25.3.

12.3.4. Buildings of Non-residential Occupancy

12.3.4.1. Application

(1) Except where exempted by Supplementary Standard SB-10, this Subsection applies to the energy efficiency of *buildings* or parts of *buildings* described in Sentence 12.2.1.1.(4).

12.3.4.2. Thermal Resistance of the Building Envelope

(1) Except as permitted in Sentences (2) and (3), the minimum thermal resistance of all walls, ceilings and floors that separate heated space from unheated space, the exterior air or the exterior *soil* shall conform to Table 12.3.4.2.A.

(2) Where the top of a *foundation* wall is less than 1 200 mm above the adjoining ground level, those portions of the *foundation* wall that are above ground may be insulated to the level required for the below grade portion of the *foundation* wall.

Table 12.3.4.2.A.
Minimum Thermal Resistance of Building Assemblies Based on Degree-Day Zones(1)

Forming Part of Sentence 12.3.4.2.(1)

COLUMN 1	COLUMN 2	COLUMN 3
Building Assembly	Minimum RSI Value of Assembly[2]	
	Zone 1 Less than 5000 degree-days	Zone 2 5000 or more degree-days
Opaque wall assembly	2.63	3.83
Wall assembly adjacent to unconditioned space	1.61	2.02
Below grade wall(3)	2.11	2.82
Roof assembly	3.91	5.68
Floor assembly over unconditioned space	4.52	4.52

Notes to Table 12.3.4.2.A.:

(1) Number of degree-days for individual locations are contained in Supplementary Standard SB-1.

(2) The thermal resistance determined for the *building* assembly shall take into account the thermal bridging in the assembly, as determined by Supplementary Standard SB-10.

(3) "RSI value" shown is for insulation only.

(3) The minimum thermal resistance of a slab-on-ground shall conform to Table 12.3.4.2.B.

Table 12.3.4.2.B.
Minimum Thermal Resistance for Slab-On-Ground Insulation

Forming Part of Sentence 12.3.4.2.(3)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
Type of Slab-On-Ground	Position of Insulation	Length of Insulation, mm	Minimum RSI Value Required[1]
Unheated	Horizontal	600	3.17
		1200	1.94
	Vertical	600	1.41
		1200	0.70
Heated	Horizontal	600	3.52
		1200	2.29
	Vertical	600	1.76
		1200	1.06

Notes to Table 12.3.4.2.B.:

(1) "RSI value" shown is for insulation only.

(4) The maximum overall coefficient of heat transfer for windows that separate heated space from unheated space shall conform to Table 12.3.4.2.C.

Table 12.3.4.2.C. Maximum Overall Coefficient of Heat Transfer for Windows

Forming Part of Sentence 12.3.4.2.(4)

COLUMN 1	COLUMN 2
Window-to-Wall Ratio	Maximum Overall Coefficient of Heat Transfer Required, W/ m²·°C
less than 0.2	3.01
0.2 to 0.4	2.28
more than 0.4	1.70

(5) Except for swinging glass doors, the minimum thermal resistance of doors that separate heated space from unheated space shall be not less than RSI 0.7.

12.3.4.3. Air Infiltration

(1) Where a *building* component or assembly separates interior conditioned space from exterior space, interior space from ground or environmentally dissimilar interior spaces, the component or assembly shall contain an *air barrier* system conforming to the applicable requirements of Part 5 or Section 9.25.

12.3.4.4. Heating, Ventilating and Air-Conditioning

(1) A heating, ventilating and *air-conditioning* system that serves more than one heating, ventilating and *air-conditioning* zone shall conform to Clauses 12.2.1.1.(2)(a) or (b).

(2) Sentences (3) to (11) and Article 12.3.4.5. apply to a heating, ventilating and *air-conditioning* system that serves a single heating, ventilating and *air-conditioning* zone.

(3) The energy efficiency of equipment in a heating, ventilating and *air-conditioning* system that serves a single heating, ventilating and *air-conditioning* zone shall conform to Supplementary Standard SB-10.

(4) An *air-conditioning* system with a cooling capacity of 40 kW or more shall have an economizer,

(a) controlled by appropriate high limit shut-off control, and

(b) equipped with either barometric or powered relief sized to prevent excess pressurization of the *building*.

(5) Outdoor air dampers for economizer use shall be provided with blade and jamb seals.

(6) A heat recovery ventilator with a recovery effectiveness of 50% or more at the outside winter design temperature shall be provided where the quantity of the outdoor air supplied to the air duct distribution system is,

(a) more than 1 400 L/s, and

(b) more than 70% of the supply air quantity of the system.

(7) Where a heat recovery ventilator is installed, the system shall have provisions to bypass or control the heat recovery ventilator to permit operation of the air economizer.

(8) A heating, ventilating and *air-conditioning* system shall be controlled by a manual changeover or dual setpoint thermostat.

(9) Except for a system requiring continuous operation, a heating, ventilating and *air-conditioning* system that has a cooling or heating capacity greater than 4.4 kW and a supply fan motor rated for more than 0.5 kW shall be provided with a time clock that,

(a) is capable of starting and stopping the system under different schedules for seven different day-types per week,

(b) is capable of retaining programming and time setting during a loss of power for a period of 10 hours or more,

(c) includes an accessible manual override that allows temporary operation of the system for up to two hours,

(d) is capable of temperature setback down to 13°C during off-hours, and

(e) is capable of temperature setup to 32°C during off-hours.

(10) Where separate heating and cooling equipment serves the same temperature zone, thermostats shall be interlocked to prevent simultaneous heating and cooling.

(11) A heating, ventilating and *air-conditioning* system with a design supply air capacity greater than 5000 L/s shall have optimum start controls

12.3.4.5. Ducts, Plenums and Piping

(1) A duct or a *plenum* that is not protected by an insulated exterior wall or that is exposed to an unheated space shall be,

(a) sealed to a Class A seal level in accordance with the SMACNA, "HVAC Duct Construction Standards - Metal and Flexible", to minimize air leakage, and

(b) insulated to provide a thermal resistance of not less than RSI 1.4.

(2) A supply or *exhaust duct* or *plenum* that is located in a conditioned space shall be sealed to a Class C seal level in accordance with the SMACNA, "HVAC Duct Construction Standards - Metal and Flexible", to minimize air leakage.

(3) Except for piping within prefabricated equipment, piping used for steam, hot water heating or cooling shall be insulated in accordance with Table 12.3.4.5.

Table 12.3.4.5.
Minimum Thickness of Pipe Insulation(1)

Forming Part of Sentences 12.3.4.5.(3) and 12.3.4.6.(2)

COLUMN 1	COLUMN 2	COLUMN 3
Use of pipe	Nominal pipe *size* not more than 40 mm	Nominal pipe *size* more than 40 mm
Steam	40	50
Hot water heating	25	40
Domestic hot water	12	25
Cooling	12	25

Notes to Table 12.3.4.5.:

(1) Insulation material shall have a thermal conductivity of not more than 0.42 W/ m·°C.

(4) Insulation exposed to weather shall be protected by a covering such as aluminum, sheet metal, painted canvas or plastic.

(5) An *exhaust duct* with a design capacity of more than 140 L/s on a heating, ventilating and *air conditioning* system that does not operate continuously shall be equipped with a gravity or motorized damper that will automatically shut when the system is not in operation.

(6) An air duct distribution system shall be balanced in the following sequence:

1. Minimize throttling losses.
2. If the fan is rated for more than 0.75 kW, adjust the fan speed to meet design flow conditions.

(7) A hydronic system shall be proportionately balanced to minimize throttling losses.

12.3.4.6. Service Water Heating

(1) Water heating equipment, hot water supply boilers used solely for heating *potable* water and hot water storage tanks shall meet the minimum efficiency values in Supplementary Standard SB-10.

(2) Domestic hot water heating piping shall be insulated in accordance with Table 12.3.4.5. if it is,

(a) recirculating system piping,

(b) located within the first 2.5 m of outlet piping in a constant temperature non-recirculating storage system,

(c) an inlet pipe located between the storage tank and a heat trap in a non-recirculating storage system, or

(d) a pipe that is externally heated by methods such as a heat trace or impedance heating.

(3) A hot water storage tank shall be provided with a temperature control to permit adjustment of the water storage temperature.

(4) An automatic time switch or other control that can be set to switch off the usage temperature maintenance system during extended periods when hot water is not required shall be installed in a domestic hot water system that is designed to maintain usage temperatures in hot water pipes such as recirculating hot water systems or heat trace.

(5) If a recirculating pump is used to maintain storage tank water temperature, the pump shall be equipped with a control to limit its operation to a period from the start of the heating cycle to a maximum of five minutes after the end of the heating cycle.

(6) In a washroom located in a public facility, a device shall be provided to control the maximum temperature of water delivered from a lavatory faucets to not more than 43°C.

(7) A vertical pipe riser that serves a storage water heater or a storage tank shall have heat traps on both the inlet and outlet piping as close as practical to the tank if,

(a) the riser is in a non-recirculating system, and

(b) the storage water heater or the storage tank does not have integral heat traps.

(8) A system that provides space heating and domestic water heating shall conform to Clauses 12.2.1.1.(2)(a) or (b).

12.3.4.7. Lighting

(1) Except as provided in Sentence (2), Articles 12.3.4.7. to 12.3.4.11. apply to,

(a) interior spaces of a *building*,

(b) exterior *building* features, including facades, illuminated roofs, architectural features, entrances, *exits*, loading docks and illuminated canopies, and

(c) exterior *building* ground lighting provided through the *building's* electrical service.

(2) Articles 12.3.4.7. to 12.3.4.11. do not apply to emergency lighting that is automatically turned off during the normal use of the *building*.

(3) Fluorescent light ballasts shall meet or exceed the minimum ballast efficacy factors required by Supplementary Standard SB-10.

(4) Except as provided in Sentence (5), luminaires designed for use with one or three linear fluorescent lamps greater than 30 W each shall use two-lamp tandem-wired ballasts in place of single-lamp ballasts when two or more luminaires are in the same space and on the same control device.

(5) The tandem wiring required by Sentence (4) is not required for,

(a) recessed luminaires located more than 3 m apart, measured centre to centre,

(b) surface mounted or pendant luminaires that are not continuous,

(c) luminaires that use single-lamp high-frequency electronic ballasts,

(d) luminaires that use three-lamp high-frequency electronic or three-lamp electromagnetic ballasts, and

(e) luminaires on emergency circuits.

12.3.4.8. Interior Lighting

(1) The interior lighting power allowance for a *building* is the sum of the lighting power allowances, in watts, of all building area types and shall include all permanently installed general, task and furniture lighting systems and luminaires.

(2) The interior lighting power allowance shall be determined by multiplying the lighting power density given in Table 12.3.4.8. by the gross lighted areas of the building area type.

Table 12.3.4.8.
Interior Lighting Power Densities

Forming Part of Sentence 12.3.4.8.(2)

COLUMN 1	COLUMN 2
Building Area Type	Lighting Power Density, W/m^2
Automotive Facility	10
Fast Food	15
Dormitory	11
Health Care Clinic	11
Manufacturing Facility	14
Office	11
Parking Garage	3
Police Station without detention quarters/Fire Station	11
Post Office	12
Retail	16
Transportation	11
Warehouse	9
Workshop	15

(3) The installed interior lighting power shall not exceed the interior lighting power allowance.

(4) Except as provided in Sentence (5), the installed interior lighting power shall include all power used by luminaires, including lamps, ballasts, current regulators and control devices.

(5) The following lighting equipment and applications shall not be considered when determining the installed interior lighting power or the interior lighting power allowance:

(a) lighting that is integral to equipment or instrumentation and is installed by its manufacturer,

(b) lighting specifically designed for use only during medical or dental procedures and lighting integral to medical equipment,

(c) lighting that is integral to both open and glass-enclosed refrigerator and freezer cases,

(d) lighting that is integral to food warming and food preparation equipment,

(e) lighting for plant growth or maintenance,

(f) lighting in spaces specifically designed for use by visually impaired persons,

(g) lighting in retail display windows if the display area is enclosed by ceiling-height partitions,

(h) lighting in interior spaces that have been specifically designated as a *heritage building*,

(i) lighting that is an integral part of advertising or directional signage,

(j) *exit* signs,

(k) lighting that is displayed for sale, and

(l) educational lighting demonstration systems.

(6) Trade-offs among building area types are permitted provided that the total installed interior lighting power does not exceed the interior lighting power allowance.

12.3.4.9. Interior Lighting Controls

(1) Except as provided by Sentence (2), interior lighting in a *building* that exceeds 500 m^2 in *building area* shall be controlled with an automatic control device to shut off *building* lighting in all spaces.

(2) Sentence (1) does not apply to,

(a) lighting intended for 24-hour operation,

(b) emergency lighting, or

(c) lighting for spaces where an automatic shut-off would endanger safety or security

(3) The automatic control device required in Sentence (1) shall operate on,

(a) a scheduled basis using a time-of-day operated control device that turns lighting off at specific programmed times,

(b) an occupant sensor that shall turn lighting off within 30 minutes of an occupant leaving a space, or

(c) a signal from another control or alarm system that indicates the area is unoccupied.

(4) Where the automatic control device conforms to Clause 12.3.4.9.(3)(a), an independent program schedule shall be provided for each floor.

(5) Each space enclosed by *partitions* that extend to the ceiling shall have at least one control device to independently control the general lighting within the space.

(6) Each manual operated control device shall be readily accessible and located so the occupants can see the controlled lighting.

(7) Except as required by Sentences (8) and (9) and except for reasons of safety or security, an individual control device shall,

(a) be capable of being activated,

    (i) either manually, or

    (ii) automatically by sensing an occupant,

(b) control a floor area having an area not more than 240 m^2, and

(c) be capable of overriding at any time of-day scheduled shut-off control for not more than 4 h.

(8) Except in spaces with multi-scene control, a control device that automatically turns lighting off within 30 minutes of all occupants leaving a space shall be provided in,

(a) conference rooms,

(b) meeting rooms, and

(c) employee lunch and break rooms.

(9) A separate control device shall control,

(a) display lighting,

(b) accent lighting,

(c) case lighting,

(d) task lighting,

(e) non-visual lighting, and

(f) demonstration lighting.

12.3.4.10. Exterior Lighting

(1) Except as provided in Sentence (2), this Article applies to exterior areas conforming to Sentence 12.3.4.7.(1).

(2) If the lighting is equipped with a control device independent of the control of other lighting, Sentence (1) does not apply to,

(a) specialized signal, directional, and marker lighting associated with transportation,

(b) advertising signage or directional signage,

(c) lighting integral to equipment or instrumentation and installed by its manufacturer,

(d) temporary lighting,

(e) lighting for industrial production, material handling, transportation sites, and associated storage areas, and

(f) lighting used to highlight features of public monuments and *heritage buildings*.

(3) The exterior lighting power allowance for the exterior areas appurtenant to a *building* shall be determined by multiplying the lighting power density given in Table 12.3.4.10. by the areas or lengths of lighted exterior spaces.

Table 12.3.4.10.
Exterior Lighting Power Densities

Forming Part of Sentence 12.3.4.10.(3)

COLUMN 1	COLUMN 2
Uncovered parking lots and drives	1.6 W/m^2
Walkways less than 3 m wide	3.3 W/linear m
Walkways 3 m or greater, plaza areas, special feature areas	2.2 W/m^2
Stairways	10.8 W/m^2
Building main entries	98 W/linear m of door width
Other doors	66 W/linear m of door width
Canopies (free standing and attached and overhangs)	13.5 W/m^2
Outdoor sales open areas (including vehicle sale lots)	5.4 W/m^2
Street frontage for vehicle sales lots in addition to "open area" allowance	66 W/linear m
Building facades	2.2 W/m^2 for each illuminated wall or surface or 16.4 W/linear m for each illuminated wall or surface length
Automated teller machines and night depositories	270 W per location plus 90 W per additional ATM per location
Entrances and gatehouse inspection stations at guarded facilities	13.5 W/m^2 of uncovered area
Loading areas for law enforcement and emergency service vehicles	5.4 W/m^2 of uncovered area
Drive-up windows	400 W per drive-through
Parking near 24-hour retail entrances	800 W per main entry

(4) The total exterior lighting power allowance for the exterior areas appurtenant to a *building* is the sum of the individual power allowances determined from Sentence (3) plus an additional unrestricted allowance of 5% of that sum.

(5) The installed exterior lighting power shall not exceed the exterior lighting power allowance.

(6) All exterior *building* grounds luminaires that operate at greater than 100 watts shall contain lamps having a minimum efficacy of 60 lm/W unless the luminaire is controlled by a motion sensor.

12.3.4.11. Exterior Lighting Controls

(1) Except as provided in Sentence (2), lighting for exterior applications shall have automatic controls capable of turning off exterior lighting when,

(a) sufficient daylight is available, or

(b) the lighting is not required during night time hours.

(2) Sentence (1) does not apply to,

(a) lighting for covered vehicle entrances or exits from a *building*,

(b) parking structures, and

(c) where required for safety, security, or eye adaptation.

(3) Lighting designated for dusk-to-dawn operation shall be controlled by a time switch or photosensor.

(4) Lighting not designated for dusk-to-dawn operation shall be controlled by a time switch.

12.3.4.12. Electric Motors

(1) Electric motors shall conform to the efficiency levels in Supplementary Standard SB-10.

Section 12.4. Water Efficiency

12.4.1. General

12.4.1.1. Plumbing Systems

(1) All *buildings* shall conform to the water efficiency requirements of Subsection 7.6.4.

O. Reg. 350/06, Division B, Part 12.

DIVISION C

PART 1
ADMINISTRATIVE PROVISIONS

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1.1.1. Administration

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1.9.1. Fees

Section 1.1. Administration

1.1.1. Administration

1.1.1.1. Conformance with Administrative Requirements

(1) This Code shall be administered in conformance with the Act.

Section 1.2. Design and General Review

1.2.1. Design

1.2.1.1. Design by Architect or Professional Engineer

(1) Except as permitted in Sentences (2) and (3), the *construction*, including, for greater certainty, enlargement or alteration, of every *building* or part of it described in Table 1.2.1.1. and this Article shall be designed and reviewed by an *architect*, *professional engineer* or both.

Table 1.2.1.1.(4)
Design and General Review

Forming Part of Sentence 1.2.1.1.(1)

COLUMN 1	COLUMN 2	COLUMN 3
Building Classification by *Major Occupancy*	*Building* Description	Design and General Review by:
Assembly occupancy only	Every *building*	*Architect* and *professional engineer*(1)
Assembly occupancy and any other *major occupancy* except *industrial*	Every *building*	*Architect* and *professional engineer*(1)
Care or detention occupancy only	Every *building*	*Architect* and *professional engineer*(1)
Care or detention occupancy and any other *major occupancy* except *industrial*	Every *building*	*Architect* and *professional engineer*(1)
Residential occupancy only	Every *building* that exceeds 3 *storeys* in *building height*	*Architect* and *professional engineer*(1)
	Every *building* that exceeds 600 m^2 in *gross area* and that contains a *residential occupancy* other than a *dwelling unit* or *dwelling units*	*Architect*(2)
Residential occupancy only	Every *building* that exceeds 600 m^2 in *gross area* and contains a *dwelling unit* above another *dwelling unit*	*Architect*(2)
	Every *building* that exceeds 600 m^2 in *building area* contains 3 or more *dwelling units* and has no *dwelling unit* above another *dwelling unit*	*Architect*(2)
Residential occupancy and any other *major occupancy* except *industrial*, *assembly* or *care or detention occupancy*	Every *building* that exceeds 600 m^2 in *gross area* or 3 *storeys* in *building height*	*Architect* and *professional engineer*(1)
Business and personal services occupancy only	Every *building* that exceeds 600 m^2 in *gross area* or 3 *storeys* in *building height*	*Architect* and *professional engineer*(1)
Business and personal services occupancy and any other *major occupancy* except *industrial*, *assembly* or *care or detention occupancy*	Every *building* that exceeds 600 m^2 in *gross area* or 3 *storeys* in *building height*	*Architect* and *professional engineer*(1)
Mercantile occupancy only	Every *building* that exceeds 600 m^2 in *gross area* or 3 *storeys* in *building height*	*Architect* and *professional engineer*(1)
Mercantile occupancy and any other *major occupancy* except *industrial*, *assembly* or *care or detention occupancy*	Every *building* that exceeds 600 m^2 in *gross area* or 3 *storeys* in *building height*	*Architect* and *professional engineer*(1)
Industrial occupancy only and where there are no subsidiary *occupancies*	Every *building* that exceeds 600 m^2 in *gross area* or 3 *storeys* in *building height*	*Architect* or *professional engineer*(3)
Industrial occupancy and one or more other *major occupancies* where the portion of the area occupied by one of the other *major* or subsidiary *occupancies* exceeds 600 m^2.	The non-industrial portion of every *building*	*Architect* and *professional engineer*(1)
	The industrial portion of every *building*	*Architect* or *professional engineer*(3)
Industrial occupancy and one or more other *major occupancies* where no portion of the area occupied by one of the other *major* or subsidiary *occupancies* exceeds 600 m^2.	Every *building* that exceeds 600 m^2 in *gross area* or 3 *storeys* in *building height*	*Architect* or *professional engineer*(3)

Notes To Table 1.2.1.1.:

(1) An *architect* shall provide services within the practice of architecture and a *professional engineer* shall provide the services within the practice of professional engineering.

(2) An *architect* may engage a *professional engineer* to provide services within the practices of professional engineering.

(3) Only a *professional engineer* may provide services within the practice of professional engineering.

(4) Requirements for design and general review by an *architect* or *professional engineer* or a combination of both for the *construction*, enlargement or alteration of a *building* are set out in the *Architects Act* and the *Professional Engineers Act*.

(2) An *architect* may provide the services within the practice of professional engineering in any *building* described in Table 1.2.1.1., or a *professional engineer* may provide the services within the practice of architecture in any *building* described in Table. 1.2.1.1. where to do so does not constitute a substantial part of the services provided by the other profession related to the *construction* of the *building* and is necessary,

(a) for the *construction* of the *building* and is incidental to the other services provided by the *architect* or *professional engineer*, or

(b) for coordination purposes.

(3) The requirement for an *architect* does not apply to the preparation or provision of a design for interior space for a *building*, including finishes, fixed or loose furnishings, equipment, fixtures and partitioning of space, and related exterior elements such as signs, finishes and glazed openings used for display purposes, that does not affect or is not likely to affect,

(a) the structural integrity,

(b) a fire safety system or *fire separation*,

(c) a main entrance or *public corridor* on a floor,

(d) an *exit* to a public thoroughfare or to the exterior,

(e) the *construction* or location of an exterior wall, or

(f) the usable floor space through the addition of a *mezzanine*, infill or other similar element, of the *building*.

(4) Where a *building* or part of it described in Table 1.2.1.1. is designed by an *architect* or a *professional engineer* or a combination of both as required by this Article, all plans, sketches, drawings, graphic representations, specifications and other documents that are prepared by an *architect*, *professional engineer* or both and that form the basis for the issuance of a permit under section 8 of the Act or any changes to it authorized by the *chief building official* shall bear the signature and seal of the *architect*, *professional engineer* or both, as applicable.

(5) Where the *foundations* of a *building* are to be constructed below the level of the footings of an adjacent *building* and within the angle of repose of the *soil*, as drawn from the bottom of the footings, the *foundations* shall be designed by a *professional engineer*.

(6) The thermal design of a *building* in accordance with Subsection 12.3.3. of Division B shall be prepared and provided by an *architect* or *professional engineer* or a combination of both.

(7) A sprinkler protected glazed wall assembly described in Article 3.1.8.18. of Division B shall be designed and reviewed by a *professional engineer*.

(8) A *shelf and rack storage system* described in Section 3.16. of Division B shall be designed and reviewed by a *professional engineer*.

(9) The time-based egress analysis for a *shelf and rack storage system* described in Sentence 3.16.1.6.(7) of Division B shall be prepared and provided by an *architect* or *professional engineer* or a combination of both.

(10) The supporting framing structure and anchorage system for a tent occupying an area greater than 225 m^2 shall be designed and reviewed by a *professional engineer*.

(11) A sign structure shall be designed by an *architect* or *professional engineer* where it is,

(a) a ground sign that exceeds 7.5 m in height above the adjacent finished ground,

(b) a projecting sign that weighs more than 115 kg, or

(c) a roof sign that has any face that is more than 10 m^2.

(12) A projecting sign attached or fastened in any manner to a parapet wall shall be designed by an *architect* or *professional engineer*.

1.2.2. General Review

1.2.2.1. General Review by Architect or Professional Engineer

(1) Except as permitted in Sentence (2), a person who intends to *construct* or have constructed a *building* required to be designed by an *architect*, *professional engineer* or both, shall ensure that an *architect*, *professional engineer* or both are retained to undertake the general review of the *construction* of the *building* in accordance with the performance standards of the Ontario Association of Architects or the Association of Professional Engineers of Ontario, as applicable, to determine whether the *construction* is in general conformity with the plans, sketches, drawings, graphic representations, specifications and other documents that are prepared by an *architect*, *professional engineer* or both and that form the basis for the issuance of a permit under section 8 of the Act or any changes to it authorized by the *chief building official*. Copies of written reports arising out of the general review shall be forwarded to the *chief building official* or *registered code agency*, as the case may be, by the *architect*, *professional engineer* or both who have been retained to undertake the general review of the *construction* of the *building*.

(2) An *architect* or a *professional engineer* need not be retained to undertake the general review of *construction* of a *building* where the *building* is designed in accordance with Subsection 12.3.3. of Division B.

1.2.2.2. Restriction for General Review

(1) Only an *architect* may carry out or provide the general review of the *construction* of a *building*,

(a) that is constructed in accordance with a design prepared or provided by an *architect*, or

(b) in relation to services that are provided by an *architect* in connection with the design in accordance with which the *building* is constructed.

(2) Only a *professional engineer* may carry out or provide the general review of the *construction* of a *building*,

(a) that is constructed in accordance with a design prepared or provided by a *professional engineer*, or

(b) in relation to services that are provided by a *professional engineer* in connection with the design in accordance with which the *building* is constructed.

1.2.2.3. Demolition of a Building

(1) The applicant for a permit respecting the *demolition* of a *building* shall retain a *professional engineer* to undertake the general review of the project during *demolition*, where,

(a) the *building* exceeds 3 *storeys* in *building height* or 600 m² in *building area*,

(b) the *building* structure includes pre-tensioned or post-tensioned members,

(c) it is proposed that the *demolition* will extend below the level of the footings of any adjacent *building* and occur within the angle of repose of the *soil*, drawn from the bottom of such footings, or

(d) explosives or a laser are to be used during the course of *demolition*.

Section 1.3. Permits and Inspections

1.3.1. Permits

1.3.1.1. Requirement for Permits

(1) A person is exempt from the requirement to obtain a permit under section 8 of the Act,

(a) for the *demolition* of a *building* located on a farm,

(b) subject to Sentence (2), for the *construction* or *demolition* of a *building* in territory without municipal organization, or

(c) for the *construction* of a Class 1 *sewage system*.

(2) The exemption in Clause (1)(b) from the requirement to obtain a permit does not apply to the *construction* of a *sewage system* in territory without municipal organization.

(3) Where a permit is required for the *demolition* of a *building* in Sentence 1.2.2.3.(1), descriptions of the structural design characteristics of the *building* and the method of *demolition* shall be included in the application for a permit to demolish the *building*.

(4) No person shall commence *demolition* of a *building* or any part of a *building* before the *building* has been vacated by the occupants except where the safety of the occupants is not affected.

(5) A tent or group of tents is exempt from the requirement to obtain a permit under section 8 of the Act and is exempt from compliance with the Code provided that the tent or group of tents are,

(a) not more than 60 m^2 in aggregate ground area,

(b) not attached to a *building*, and

(c) constructed more than 3 m from other structures.

1.3.1.2. Applications for Permits under Section 8 of the Act

(1) An application for a permit under section 8 of the Act to *construct* or *demolish* a *building* shall be made by,

(a) the owner of the property on which the proposed *construction* or *demolition* is to take place, or

(b) the authorized agent of the owner referred to in Clause (a).

(2) An application referred to in Sentence (1) that is made after June 30, 2005 shall be in a form approved by the *Minister*.

(3) In Sentence (1),

owner includes, in respect of the property on which the *construction* or *demolition* will take place, the registered owner, a lessee and a mortgagee in possession.

1.3.1.3. Period Within Which a Permit is Issued or Refused

(1) Subject to Sentences (2) and (3), if an application for a permit under subsection 8 (1) of the Act that meets the requirements of Sentence (5) is submitted to a *chief building official*, the *chief building official* shall, within the time period set out in Column 3 of Table 1.3.1.3. corresponding to the class of *building* described in Column 2 of Table 1.3.1.3. for which the application is made,

(a) issue the permit, or

(b) refuse to issue the permit and provide in writing all of the reasons for the refusal.

(2) If an application for a permit under subsection 8 (1) of the Act proposes *construction* or *demolition* of two or more *buildings* of different classes described in Column 2 of Table 1.3.1.3. that have different time periods in Column 3 of Table 1.3.1.3., the longer of the time periods shall be the time period for the purposes of Sentence (1).

(3) If an application for a permit under subsection 8 (1) of the Act proposes *construction* or *demolition* of a *building* described in Sentence (4), the time period for the purposes of Sentence (1) shall be the longer of,

(a) 10 days, and

(b) the time period corresponding to the class of the *building* described in Column 2 of Table 1.3.1.3. that the *building* in Sentence (4) serves, if any.

(4) A *building* referred to in Sentence (3) is,

(a) a structure occupying an area of 10 m^2 or less that contains *plumbing*, including the *plumbing* appurtenant to it,

(b) *plumbing* not located in a structure,

(c) a *sewage system*, or

(d) a structure designated in Article 1.3.1.1. of Division A.

(5) The requirements for an application referred to in Sentence (1) for a permit under subsection 8 (1) of the Act are,

(a) that the application be made in the form described in Sentence 1.3.1.2.(2),

(b) that the application be signed by a person described in Clause 1.3.1.2.(1)(a) or (b),

(c) that all applicable fields on the application form and required schedules are completed,

(d) that all attachments indicated as being attached to the application are submitted with the application, and

(e) that the application be accompanied by the types and quantities of plans and specifications that are prescribed by the applicable by-law, resolution or regulation made under clause 7 (1) (b) of the Act.

(6) The time period described in Sentences (1) to (3) shall begin on the day following the later of,

(a) the day on which an application meeting the requirements of Sentence (5) is submitted to the *chief building official*, and

(b) the day on which payment is made of all fees that are required, under a by-law, regulation or resolution made under clause 7 (1) (c) of the Act, to be paid when the application is made.

(7) Subject to Sentences (8) and (9), the time periods described in Column 3 of Table 1.3.1.3. shall not include Saturdays, holidays and all other days when the offices of the *principal authority* are not open for the transaction of business with the public.

(8) The time period in Sentence (9) applies where,

(a) an application is made for the *construction* of a *building* that is served by a *sewage system*,

(b) *construction* is proposed in respect of the *sewage system* that serves the *building*, and

(c) a board of health, conservation authority, planning board or the council of an upper-tier *municipality* is responsible for the enforcement of the provisions of the Act and this Code related to the *sewage system* under section 3.1 of the Act or pursuant to an agreement under section 6.2 of the Act.

(9) The time period described in Sentences (1) to (3) for an application referred to in Clause (8)(a) shall begin on the day following the latest of,

(a) the day on which an application meeting the requirements of Sentence (5) is submitted to the *chief building official*.

(b) the day on which payment is made of all fees that are required, under a by-law, regulation or resolution made under clause 7 (1) (c) of the Act, to be paid when the application is made, and

(c) the day on which a permit for the *construction* of the *sewage system* referred to in Clause (8)(b) is issued.

Table 1.3.1.3.
Period Within Which Permit Shall be Issued or Refused

Forming Part of Article 1.3.1.3.

COLUMN 1	COLUMN 2	COLUMN 3
Row Number	Class of *Building*	Time Period
1	(a) A detached house, semi-detached house, townhouse, or row house where no *dwelling unit* is located above another *dwelling unit*. (b) A detached structure that serves a *building* described in Clause (a) and does not exceed 50 m^2 in *building area*. (c) A tent to which Section 3.14. of Division B applies. (d) A sign to which Section 3.15. of Division B applies.	10 days
2	(a) *Buildings* described in Clauses 1.1.2.4.(1)(a), (b) or (c) of Division A, other than *buildings* described in Column 2 of any of Rows 1 and 4 of this Table. (b) *Farm buildings* that do not exceed 600 m^2 in *building area*.	15 days
3	(a) *Buildings* described in Clauses 1.1.2.2.(1)(a), or (b) of Division A, other than *buildings* described in Column 2 of any of Rows 1 and 4 of this Table. (b) *Farm buildings* exceeding 600 m^2 in *building area*.	20 days
4	(a) *Post-disaster buildings*. (b) *Buildings* to which Subsection 3.2.6. of Division B or any provision in Articles 3.2.8.3. to 3.2.8.11. of Division B applies.	30 days

1.3.1.4. Permits Under Section 10 of the Act

(1) Except as provided in Sentence (2), the following changes in use of a *building* or part of a *building* constitute an increase in hazard for the purposes of section 10 of the Act and require a permit under section 10 of the Act:

(a) a change of the *major occupancy* of all or part of a *building* that is designated with a "Y" in Table 1.3.1.4. takes place,

(b) a *suite* of a Group C *major occupancy* is converted into more than one *suite* of Group C *major occupancy*,

(c) a *suite* or part of a *suite* of a Group A, Division 2 or a Group A, Division 4 *major occupancy* is converted to a *gaming premises*,

(d) a *farm building* or part of a *farm building* is changed to a *major occupancy*,

(e) a *building* or part of a *building* is changed to a *post-disaster building*, or

(f) the use of a *building* or part of a *building* is changed and the previous *major occupancy* of the *building* or part of the *building* cannot be determined.

Table 1.3.1.4.
Permit Required for Change of Use

Forming Part of Sentence 1.3.1.4.(1)(1)

		FROM(2)												
		A-1	A-2	A-3	A-4	B-1	B-2	B-3	C	D	E	F-1	F-2	F-3
TO(3)	A-1	N(5)	Y	Y	N(5)	Y	Y	Y	Y	Y	Y	Y	Y	Y
	A-2	Y	N(5)	Y	N(5)	Y	Y	Y	Y	Y	Y	Y	Y	Y
	A-3	Y	Y	N(5)	N(5)	Y	Y	Y	Y	Y	Y	Y	Y	Y
	A-4	Y	Y	Y	N(5)	Y	Y	Y	Y	Y	Y	Y	Y	Y
	B-1	Y	Y	Y	N(5)	N(5)	Y	Y	Y	Y	Y	Y	Y	Y
	B-2	Y	Y	Y	N(5)	Y	N(5)	Y	Y	Y	Y	Y	Y	Y
	B-3	Y	Y	Y	N(5)	Y	N(5)	N(5)	Y	Y	Y	Y	Y	Y
	C	Y	Y	Y	N(5)	Y	N(5)	N(5)	-(4)	Y	Y	Y	Y	Y
	D	N(5)	N(5)	Y	N(5)	Y	N(5)	N(5)	Y	N(5)	Y	Y	N(5)	N(5)
	E	Y	Y	Y	N(5)	Y	Y	Y	Y	Y	N(5)	Y	Y	Y
	F-1	Y	Y	Y	N(5)	Y	Y	Y	Y	Y	Y	N(5)	Y	Y
	F-2	Y	Y	Y	N(5)	Y	Y	Y	Y	Y	Y	N(5)	N(5)	Y
	F-3	Y	N(5)	Y	N(5)	Y	Y	Y	Y	N(5)	N(5)	N(5)	N(5)	N(5)

Notes to Table 1.3.1.4.:

(1) See Clause 1.3.1.4.(1)(a) and Clauses 3.17.1.1.(1)(a) and 9.41.1.1.(1)(a) of Division B.

[2] *Major occupancy* of all or part of a *building* before change of use.

[3] *Major occupancy* of all or part of a *building* after change of use.

[4] See Clause 1.3.1.4.(1)(b) and Clauses 3.17.1.1.(1)(b), 9.41.1.1.(1)(b) and 11.4.2.3.(1)(b) of Division B.

[5] "N" is only applicable where the *major occupancy* of the entire *suite* is changed.

(2) A person is exempt from the requirement to obtain a permit under section 10 of the Act where the change in use of the *building* or part of the *building* will result from proposed *construction* and a permit under section 8 of the Act has been issued in respect of such *construction*.

(3) A person is exempt from the requirement to obtain a permit under section 10 of the Act for the change of use of a *building* in unorganized territory.

1.3.1.5. Conditional Permits

(1) The *chief building official* shall not issue a conditional permit for any stage of *construction* under subsection 8 (3) of the Act unless compliance with the following *applicable laws* has been achieved in respect of the *construction* of the proposed *building*:

(a) regulations made by a conservation authority under clause 28 (1) (c) of the *Conservation Authorities Act* with respect to permission of the authority for the *construction* of a *building* or structure if, in the opinion of the authority, the control of flooding, erosion, dynamic beaches or pollution or the conservation of land may be affected by the development,

(b) section 5 of the *Environmental Assessment Act* with respect to the approval of the Minister or the Environmental Review Tribunal to proceed with an undertaking,

(c) subsection 24 (3) of the *Niagara Escarpment Planning and Development Act*,

(d) subsection 30 (2) of the *Ontario Heritage Act* with respect to the consent of the council of a *municipality* for the alteration or *demolition* of a *building*,

(e) section 33 of the *Ontario Heritage Act* with respect to the consent of the council of a *municipality* for the alteration of property,

(f) section 34 of the *Ontario Heritage Act* with respect to the consent of the council of a *municipality* for the *demolition* of a *building*,

(g) section 34.5 of the *Ontario Heritage Act* with respect to the consent of the Minister to the alteration or *demolition* of a designated *building*,

(h) subsection 34.7 (2) of the *Ontario Heritage Act* with respect to the consent of the Minister to the alteration or *demolition* of a designated *building*,

(i) section 42 of the *Ontario Heritage Act* with respect to the permit given by the council of a municipality for the erection, alteration or *demolition* of a *building*.

(2) For the purposes of issuing a conditional permit under subsection 8 (3) of the Act, a person is exempt from the requirement in clause 8 (3) (a) of the Act of compliance with by-laws passed under sections 34 and 38 of the *Planning Act* where,

(a) a committee of adjustment has made a decision under section 45 of the *Planning Act* authorizing one or more minor variances from the provisions of any by-laws made under sections 34 and 38 of that Act,

(b) such minor variance or variances result in the achievement of full compliance with such by-laws, and

(c) no person informed the committee of adjustment of objections to the minor variances either in writing or in person at the hearing of the application.

(3) For the purposes of issuing a conditional permit under subsection 8 (3) of the Act, a person is exempt from the requirement in clause 8 (3) (a) of the Act of compliance with by-laws passed under sections 34 and 38 of the *Planning Act* where the *construction* in respect of which the conditional permit is issued is required in order to comply with an order issued under subsection 21 (1) of the *Fire Protection and Prevention Act, 1997* or under subsection 15.9 (4) of the Act.

(4) A permit issued under subsection 8 (3) of the Act shall indicate its conditional nature.

1.3.2. Site Documents

1.3.2.1. Permit Posting

(1) Where a permit has been issued pursuant to the Act, the person to whom it is issued shall have the permit or a copy of it posted at all times during *construction* or *demolition* in a conspicuous place on the property in respect of which the permit was issued.

1.3.2.2. Documentation on Site

(1) The person in charge of the *construction* of the *building* shall keep and maintain on the site of the *construction*,

(a) at least one copy of drawings and specifications certified by the *chief building official* or a person designated by the *chief building official* to be a copy of those submitted with the application for the permit to *construct* the *building*, together with changes that are authorized by the *chief building official* or a person designated by the *chief building official*, and

(b) authorization or facsimiles of it received from the Building Materials Evaluation Commission, including specified terms and conditions.

1.3.3. Occupancy of Unfinished Building

1.3.3.1. Occupancy Permit

(1) Except as permitted in Sentence 1.3.3.2.(1), a person may occupy or permit to be occupied any *building* or part of it that has not been fully completed at the date of occupation where the *chief building official* or a person designated by the *chief building official* has issued a permit authorizing occupation of the *building* or part of it prior to its completion in accordance with Sentence (2).

(2) The *chief building official* or a person designated by the *chief building official* shall issue a permit authorizing occupation of a *building*, where,

(a) the structure of the *building* or part of it is completed to the roof,

(b) the enclosing walls of the *building* or part of them are completed to the roof,

(c) the walls enclosing the space to be occupied are completed, including balcony *guards*,

(d) all required *fire separations* and *closures* are completed on all *storeys* to be occupied,

(e) all required *exits* are completed and fire separated including all doors, door hardware, self-closing devices, balustrades and handrails from the uppermost floor to be occupied down to *grade* level and below if an *exit* connects with lower *storeys*,

(f) all shafts including *closures* are completed to the floor-ceiling assembly above the *storey* to be occupied and have a temporary *fire separation* at such assembly,

(g) measures have been taken to prevent access to parts of the *building* and site that are incomplete or still under *construction*,

(h) floors, halls, lobbies and required *means of egress* are kept free of loose materials and other hazards,

(i) if service rooms should be in operation, required *fire separations* are completed and all *closures* installed,

(j) all *building drains*, *building sewers*, *water systems*, *drainage systems* and *venting systems* are complete and tested as operational for the *storeys* to be occupied,

(k) required lighting, heating and electrical supply are provided for the *suites*, rooms and common areas to be occupied,

(l) required lighting in corridors, stairways and *exits* is completed and operational up to and including all *storeys* to be occupied,

(m) required standpipe, sprinkler and fire alarm systems are complete and operational up to and including all *storeys* to be occupied, together with required pumper connections for such standpipes and sprinklers,

(n) required fire extinguishers have been installed on all *storeys* to be occupied,

(o) main garbage rooms, chutes and ancillary services thereto are completed to *storeys* to be occupied,

(p) required fire fighting access routes have been provided and are accessible, and

(q) the *sewage system* has been completed and is operational.

(3) Where a *registered code agency* has been appointed to perform the functions described in clause 4.1 (4) (b) or (c) of the Act in respect of the *construction* of the *building*, the *chief building official* or a person designated by the *chief building official* shall issue the permit referred to in Sentence (2) after receipt of a *certificate for the occupancy of a building not fully completed* issued by the *registered code agency* in respect of the *building*.

1.3.3.2. Conditions for Residential Occupancy

(1) A person may occupy or permit to be occupied a *building* intended for *residential occupancy* that has not been fully completed at the date of occupation provided that,

(a) the *building*,

  (i) is of three or fewer *storeys* in *building height* and has a *building area* not exceeding 600 m²,

(ii) has not more than 1 *dwelling unit* above another *dwelling unit*,

(iii) has not more than 2 *dwelling units* sharing a common *means of egress*, and

(iv) has no accommodation for tourists,

(b) the following *building* components and systems are complete, operational and inspected:

(i) required *exits*, handrails and *guards*, fire alarm and detection systems, and *fire separations*,

(ii) required exhaust fume barriers and self-closing devices on doors between an attached or built-in garage and a *dwelling unit*, and

(iii) water supply, sewage disposal, lighting and heating systems,

(c) the following *building* components and systems are complete, operational, inspected and tested:

(i) *water systems*,

(ii) *building drains* and *building sewers*, and

(iii) *drainage systems* and *venting systems*, and

(d) where applicable, the *building* conforms to Article 3.1.1.3. or 9.1.1.7. of Division B.

1.3.3.3. Notification

(1) Where a person has occupied or permitted the occupancy of a *building* under this Subsection, such person shall notify the *chief building official* forthwith upon completion of the *building*.

1.3.4. Fire Department Inspection

1.3.4.1. Fire Department Approval

(1) Subject to Sentence (2), if the council of a *municipality* assigns specific responsibility for the enforcement of any portion of this Code respecting fire safety matters to an *inspector* who is the chief of the fire department of the *municipality*, the *chief building official* shall not issue a permit to *construct* a *building* unless the *inspector* approves the drawings submitted with the application for the permit as complying with that portion of this Code.

(2) If a *registered code agency* has been appointed under clause 4.1 (4) (a) or (c) of the Act,

(a) a *municipality* shall not assign responsibility under Sentence (1) to the chief of the fire department with respect to a *building* for which the *registered code agency* has been appointed, and

(b) any assignment of responsibility under Sentence (1) with respect to a *building* for which the *registered code agency* is appointed shall be cancelled as of the date of the appointment.

1.3.5. Notices and Inspections

1.3.5.1. Prescribed Notices

(1) This Article sets out the notices that are required under section 10.2 of the Act.

(2) The person to whom a permit under section 8 of the Act is issued shall notify the *chief building official* or, where a *registered code agency* is appointed under the Act in respect of the *construction* to which the notice relates, the *registered code agency* of,

(a) readiness to *construct* footings,

(b) substantial completion of footings and *foundations* prior to commencement of backfilling,

(c) substantial completion of structural framing and ductwork and piping for heating and *air-conditioning* systems, if the *building* is within the scope of Part 9 of Division B,

(d) substantial completion of structural framing and roughing-in of heating, ventilation, *air-conditioning* and air-contaminant extraction equipment, if the *building* is not a *building* to which Clause (c) applies,

(e) substantial completion of insulation, *vapour barriers* and *air barriers*,

(f) substantial completion of all required *fire separations* and *closures* and all fire protection systems including standpipe, sprinkler, fire alarm and emergency lighting systems,

(g) substantial completion of fire access routes,

(h) readiness for inspection and testing of,

(i) *building sewers* and *building drains*,

(ii) water service pipes,

(iii) fire service mains,

(iv) drainage systems and venting systems,

(v) the water distribution system, and

(vi) *plumbing* fixtures and *plumbing* appliances,

(i) readiness for inspection of suction and gravity outlets, covers and suction piping serving outlets of an *outdoor pool* described in Clause 1.3.1.1.(1)(j) of Division A, a *public pool* or a *public spa*,

(j) substantial completion of the circulation / *recirculation system* of an *outdoor pool* described in Clause 1.3.1.1.(1)(j) of Division A, a *public pool* or *public spa* and substantial completion of the pool before it is first filled with water,

(k) readiness to *construct* the *sewage system*,

(l) substantial completion of the installation of the *sewage system* before the commencement of backfilling,

(m) substantial completion of installation of *plumbing* not located in a structure, before the commencement of backfilling, and

(n) completion of *construction* and installation of components required to permit the issue of an occupancy permit under Sentence 1.3.3.1.(2) or to permit occupancy under Sentence 1.3.3.2.(1), if the *building* or part of the *building* to be occupied is not fully completed.

1.3.5.2. Additional Notices

(1) A *principal authority* may pass a by-law or resolution or make a regulation under clause 7 (1) (e) of the Act, as part of its responsibility for the enforcement of the Act, in order to establish time periods within which notice of one or more of the following stages of *construction* must be given:

(a) commencement of *construction* of the *building*,

(b) substantial completion of structural framing for each *storey*, if the *building* is a type of *building* that is within the scope of Parts of Division B other than Part 9 of Division B,

(c) commencement of *construction* of,

(i) masonry fireplaces and masonry *chimneys*,

(ii) factory-built fireplaces and allied *chimneys*, or

(iii) *stoves*, *ranges*, *space heaters* and add-on *furnaces* using solid fuels and allied *chimneys*,

(d) substantial completion of interior finishes,

(e) substantial completion of heating, ventilating, *air-conditioning* and air-contaminant extraction equipment,

(f) substantial completion of exterior cladding,

(g) substantial completion of site grading,

(h) substantial completion of the pool deck and dressing rooms for a *public pool* or *public spa* and readiness for inspection of the emergency stop system for a *public pool* or *public spa*, and

(i) completion and availability of drawings of the *building* as constructed.

(2) The person to whom a permit under section 8 of the Act is issued shall notify the *chief building official* or, if a *registered code agency* is appointed under the Act in respect of the *construction* to which the notice relates, the *registered code agency* of the stages of *construction* for which a time period for giving notice is required under Sentence (1).

1.3.5.3. Prescribed Inspections

(1) Except as provided in Sentence (2), an *inspector* or *registered code agency*, as the case may be, shall, not later than two days after receipt of a notice given under Sentence 1.3.5.1.(2), undertake a site inspection of the *building* to which the notice relates.

(2) Where a notice given under Sentence 1.3.5.1.(2) relates to matters described in Clause 1.3.5.1.(2)(k) or (l) , an *inspector* or *registered code agency*, as the case may be, shall, not later than five days after receipt of the notice, undertake a site inspection of the *sewage system* to which the notice relates.

(3) When undertaking an inspection required under Sentence (1) or (2), the *inspector* or *registered code agency*, as the case may be, may consider reports concerning whether the *building* or a part of the *building* complies with the Act or this Code.

(4) The time periods referred to in Sentences (1) and (2) shall begin on the day following the day on which the notice is given.

(5) The time periods referred to in Sentences (1) and (2) shall not include Saturdays, holidays and all other days when the offices of the *principal authority* are not open for the transaction of business with the public.

1.3.5.4. Exemption

(1) A person is exempt from the requirement in Sentences 1.3.5.1.(2) and 1.3.5.2.(2) to give notice to the *chief building official* in respect of *construction* if,

(a) a permit in respect of the *construction* was issued to the person under section 8 of the Act before July 1, 2005, and

(b) the person notifies the *chief building official* in accordance with,

 (i) Sentence 2.4.5.1.(1) of Ontario Regulation 403/97, as it read on June 30, 2005, and

 (ii) the by-law passed by the *municipality* under clause 7 (1) (e) of the Act, as the by-law read on June 30, 2005.

(2) Article 1.3.5.3. does not apply to *construction* to which Sentence (1) relates.

1.3.5.5. Construction of Sewage Systems

(1) The following information is prescribed for the purposes of subsection 15.12 (3) of the Act and must be provided to the *chief building official* before the commencement of the *construction* of a *sewage system*:

(a) the information described in Sentence 3.3.4.1.(2) as it relates to,

 (i) the person registered under Article 3.3.3.2., and

 (ii) the person with the qualifications described in Clause 3.2.3.2.(1)(a) who will supervise *construction* on-site of the *sewage system*, and

(b) the name and telephone number of the representative of the person described in Subclause (a)(i) who may be contacted by the *chief building official* in respect of the *construction* of the *sewage system*.

1.3.5.6. Orders

(1) An order issued under subsection 12 (2), 13 (1), 13 (6) or 14 (1) or clause 18 (1) (f) of the Act shall be in a form approved by the *Minister*.

1.3.6. As Constructed Plans

1.3.6.1. Application

(1) Where the council of a *municipality* has passed a by-law pursuant to clause 7 (1) (g) of the Act, the *chief building official* may require that *as constructed plans* for the whole of, or any part or system of, a *building* or any class of *buildings* be provided by the persons responsible for the *construction*.

Section 1.4. Search Warrant

1.4.1. Forms

1.4.1.1. Information & Warrant Forms

(1) An information to obtain a warrant to enter and search lands and *buildings* under subsection 21 (1) of the Act shall be in Form 1.4.1.A.

(2) A warrant to enter and search lands and *buildings* under subsection 21 (1) of the Act shall be in Form 1.4.1.B.

Form 1.4.1.A.

INFORMATION TO OBTAIN SEARCH WARRANT UNDER SECTION 21 OF THE BUILDING CODE ACT, 1992

Building Code Act, 1992

ONTARIO COURT (PROVINCIAL DIVISION)
PROVINCE OF ONTARIO

This is the information of ______________________________
(name)

of ______________________________, ______________________________
(address) (occupation)

I have reasonable ground to believe and do believe that the offence of ______________________________

______________________________ contrary to *Building Code Act, 1992*

Section ______________ has been committed and that the entry into and search of a certain building, receptacle or place, namely,

____
(building, receptacle or place)

____

of ______________________________, at ______________________________
(owner) (address)

will afford the following evidence: ______________________________

____
(describe evidence to be searched for, including things to be seized, if any)

relevant to the commission of the offence.

And I further say that my grounds for so believing are:

____

____

Therefore, I request that a search warrant be issued to

Check appropriate box

☐ enter into and search the said ______________________________
(building, receptacle or place)
______________________________ for the said evidence.

☐ enter into and search the said ______________________________
(building, receptacle or place)
______________________________ for the said evidence and to seize the

Following things: ______________________________
(describe things to be seized)

____
Informant

Sworn before me at ______________________________,

this ______ day of ______________________________, ________

____
Provincial Judge or Justice of the Peace

Form 1.4.1.B.

SEARCH WARRANT UNDER SECTION 21 OF THE BUILDING CODE ACT, 1992

Building Code Act, 1992

ONTARIO COURT (PROVINCIAL DIVISION)
PROVINCE OF ONTARIO

To: ______________________________,

Whereas, on the information on oath of ______________________, I am satisfied that there is reasonable ground to believe that the offence of ______________________ contrary to *Building Code Act, 1992* Section ______________________ has been committed and that

____
(describe evidence to be searched for, including things to be seized, if any)
____

that there is reasonable ground to believe will afford evidence of the said offence may be found

at ______________________________

____
(building, receptacle or place)

of ______________________ (owner), at ______________________ (address)

hereinafter called the premises.

This is therefore to authorise you to enter such ______________________

____
(name or location of building, receptacle or place)

between the hours of 6:00 a.m. and 9:00 p.m., or ______________________
(time warrant to be executed)

check appropriate box

☐ and to search for the said evidence.

☐ an to search the said for the said evidence and to seize the following

things: ______________________________
(describe things to be seized)

and carry them before me or another Provincial Judge or Justice of the Peace so that they may be dealt with according to the law.

This warrant expires on the _______ day of ______________, _________, a day not later than the fifteenth day after its issue.

Issued at ______________________,

this _______ day of ______________, _________

____
Provincial Judge or Justice of the Peace

Section 1.5. Designated Persons and Powers

1.5.1. General

1.5.1.1. General

(1) The *director* and employees of the Ministry of Municipal Affairs and Housing specified by the *director* are designated for the purposes of the enforcement of the Act and this Code in relation to the qualifications of,

(a) *chief building officials*,

(b) *inspectors*,

(c) *registered code agencies*,

(d) persons engaging in the activities described in subsection 15.11 (5) of the Act, and

(e) persons engaged in the business of *constructing* on site, installing, repairing, servicing, cleaning or emptying *sewage systems*.

(2) The *director* may, for the purposes set out in Sentence (1), exercise the following powers under the Act of a *chief building official*:

(a) certify for the purposes of subsection 37 (2) of the Act statements as to any matter of record in the office of the *director*, and

(b) apply for an order under section 38 of the Act.

(3) The employees of the Ministry of Municipal Affairs and Housing designated by the *director* may, for the purposes set out in Sentence (1), exercise the following powers under the Act of an *inspector*:

(a) subject to section 16 of the Act, exercise the powers of entry for inspection purposes in subsection 12 (1) of the Act, and

(b) exercise the powers of an *inspector* under section 18 of the Act.

(4) Sections 15.23 and 19 of the Act apply to the exercise of powers under this Article by the *director* and employees of the Ministry of Municipal Affairs and Housing designated by the *director*.

Section 1.6. Prescribed Person

1.6.1. General

1.6.1.1. General

(1) The *director* is prescribed for the purposes of section 38.1 of the Act.

Section 1.7. Enforcement of the Provisions of the Act and Building Code Related to Sewage Systems

1.7.1. General

1.7.1.1. General

(1) Pursuant to subsection 3.1 (1) of the Act, the boards of health and conservation authorities listed in Column 1 of Table 1.7.1.1. shall enforce the provisions of the Act and the *building code* related to *sewage systems* in the *municipalities* and the territory without municipal organization described in Column 2 of Table 1.7.1.1.

Table 1.7.1.1.
Enforcement of the provisions of the Act and the Building Code Related to Sewage Systems

Forming Part of Sentence 1.7.1.1.(1)

COLUMN 1	COLUMN 2
Board of Health or Conservation Authority	Geographic Area
Board of Health for the Northwestern Health Unit	All *municipalities* and territory without municipal organization located in the Northwestern Health Unit
Board of Health for the Thunder Bay District Health Unit	All *municipalities* and territory without municipal organization located in the Thunder Bay District Health Unit
Board of Health for the Porcupine Health Unit	All *municipalities* and territory without municipal organization located in the Porcupine Health Unit
Board of Health for the District of Algoma Health Unit	All *municipalities* and territory without municipal organization located in the District of Algoma Health Unit
Board of Health for the Sudbury and District Health Unit	All *municipalities* and territory without municipal organization located in the Sudbury and District Health Unit

COLUMN 1	COLUMN 2
Board of Health or Conservation Authority	Geographic Area
Board of Health for the Timiskaming Health Unit	All *municipalities* and territory without municipal organization located in the Timiskaming Health Unit
North Bay-Mattawa Conservation Authority	All *municipalities* and territory without municipal organization located in: 1. the District of Nipissing, except those parts of the District of Nipissing located in the Temiskaming Health Unit, and 2. the District of Parry Sound except for the Township of The Archipelago, the geographic Townships of Blair, Brown, Harrison, Henvey, Mowat and Wallbridge and the unsurveyed territory north of the geographic Township of Henvey to the French River.

Section 1.8. Language

1.8.1. Language

1.8.1.1. Language Used on Required Signs

(1) All required signs in this Code shall be displayed in the English language or in the English and French languages, including operational material on all life safety equipment and devices.

Section 1.9. Fees

1.9.1. Fees

1.9.1.1. Annual Report

(1) The report referred to in subsection 7 (4) of the Act shall contain the following information in respect of fees authorized under clause 7 (1) (c) of the Act:

(a) total fees collected in the 12-month period ending no earlier than three months before the release of the report,

(b) the direct and indirect costs of delivering services related to the administration and enforcement of the Act in the area of jurisdiction of the *principal authority* in the 12-month period referred to in Clause (a),

(c) a break-down of the costs described in Clause (b) into at least the following categories:

  (i) direct costs of administration and enforcement of the Act, including the review of applications for permits and inspection of *buildings*, and

  (ii) indirect costs of administration and enforcement of the Act, including support and overhead costs, and

(d) if a reserve fund has been established for any purpose relating to the administration or enforcement of the Act, the amount of the fund at the end of the 12-month period referred to in Clause (a).

(2) The *principal authority* shall give notice of the preparation of a report under subsection 7 (4) of the Act to every person and organization that has requested that the *principal authority* provide the person or organization with such notice and has provided an address for the notice.

1.9.1.2. Change of Fees

(1) Before passing a by-law, regulation or resolution under clause 7 (1) (c) of the Act to introduce or change a fee imposed for applications for a permit or for the issuance of a permit, a *principal authority* shall,

(a) hold at least one public meeting at which any person who attends has an opportunity to make representations with respect to the matter,

(b) ensure that a minimum of 21 days notice of the public meeting is given in accordance with Clause (c), including giving 21 days notice to every person and organization that has, within five years before the day of the public meeting, requested that the *principal authority* provide the person or organization with such notice and has provided an address for the notice,

(c) ensure that the notice under Clause (b),

  (i) sets out the intention of the *principal authority* to pass the by-law, regulation or resolution under section 7 of the Act and whether the by-law, regulation or resolution would impose any fee that was not in effect on the day the notice is given or would change any fee that was in force on the day the notice is given,

  (ii) is sent by regular mail to the last address provided by the person or organization that requested the notice in accordance with Clause (b), and

  (iii) sets out the information described in Clause (d) or states that the information will be made available at no cost to any member of the public upon request, and

(d) make the following information available to the public:

(i) an estimate of the costs of administering and enforcing the Act by the *principal authority*,

(ii) the amount of the fee or of the change to the existing fee, and

(iii) the rationale for imposing or changing the fee.

O. Reg. 350/06, Division C, Part 1.

PART 2
ALTERNATIVE SOLUTIONS, DISPUTES, RULINGS AND INTERPRETATIONS

Section 2.1. Alternative Solutions
2.1.1. Documentation of Alternative Solutions

Section 2.2. Building Code Commission
2.2.1. Hearings

Section 2.3. Building Materials Evaluation Commission
2.3.1. Application Fee

Section 2.4. Rulings and Interpretations
2.4.1. Designated Materials Evaluation Bodies
2.4.2. Minister's Rulings
2.4.3. Interpretations By Minister

Section 2.1. Alternative Solutions

2.1.1. Documentation of Alternative Solutions

2.1.1.1. Documentation

(1) The person proposing the use of an *alternative solution* shall provide documentation to the *chief building official* or *registered code agency* that,

(a) identifies applicable objectives, functional statements and acceptable solutions, and

(b) establishes on the basis of past performance, tests described in Article 2.1.1.2. or other evaluation that the proposed alternative solution will achieve the level of performance required under Article 1.2.1.1. of Division A.

(2) The documentation described in Sentence (1) shall include information about relevant assumptions, limiting or restricting factors, testing procedures, studies or *building* performance parameters, including any commissioning, operational and maintenance requirements.

2.1.1.2. Tests

(1) Where no published test method to establish the suitability of an *alternative solution* proposed under Article 2.1.1.1. exists, then the tests used for the purposes of that Article shall be designed to simulate or exceed anticipated service conditions or shall be designed to compare the performance of the material or system with a similar material or system that is known to be acceptable.

(2) The results of tests or evaluations based on test standards other than as described in this Code may be used for the purposes of Sentence (1) if the alternate test standards provide comparable results.

Section 2.2. Building Code Commission

2.2.1. Hearings

2.2.1.1. Divisions

(1) The Building Code Commission may sit in two or more divisions simultaneously so long as a quorum of each division is present.

2.2.1.2. Single Member

(1) One member of the Building Code Commission may, with the approval of the chair or vice-chair, hear and determine any dispute set out in Sentence (2) and, for that purpose, the member has all the jurisdiction and powers of the Commission.

(2) The disputes referred to in Sentence (1) are,

(a) any dispute described in clause 24 (1) (a) of the Act respecting the sufficiency of compliance with technical requirements of this Code related to *sewage systems*, and

(b) any dispute described in clauses 24 (1) (b) or (c) of the Act.

2.2.1.3. Time Period

(1) A hearing to decide a dispute described in Clause 2.2.1.2.(2)(b) shall be held not more than five days after the Commission receives an application for a hearing in a form approved by the Commission.

(2) The time period described in Sentence (1) commences on the day after the Commission receives the application and excludes Saturdays, holidays and all other days when the offices of the Government of Ontario are not open for the transaction of business with the public.

2.2.1.4. Eligibility

(1) No member of the Commission shall be,

(a) a member of the public service of Ontario,

(b) an employee of a *principal authority*, or

(c) a person who is registered under Article 3.4.3.2. as a *registered code agency*, an officer, director, partner or employee of a *registered code agency* or a person engaged by a *registered code agency* to perform functions under the Act on behalf of the *registered code agency*.

Section 2.3. Building Materials Evaluation Commission

2.3.1. Application Fee

2.3.1.1. Application Fee

(1) The fee on an application to the Building Materials Evaluation Commission is $950.00.

Section 2.4. Rulings and Interpretations

2.4.1. Designated Materials Evaluation Bodies

2.4.1.1. Designated Bodies

(1) The following body is designated as a materials evaluation body for the purposes of clause 29 (1) (a) of the Act:

Canadian Construction Materials Centre of the National Research Council of Canada

2.4.2. Minister's Rulings

2.4.2.1. Minister's Rulings

(1) The *Minister* may impose terms and conditions, including conditions of termination, when making rulings under clause 29 (1) (a) of the Act adopting the evaluation report of a materials evaluation body designated in the *building code*.

2.4.2.2. Criteria

(1) A ruling made under clause 29 (1) (c) of the Act may only approve the use of an alternative material, system or *building* design in a manner,

(a) that will, in the opinion of the *Minister*, achieve the level of performance that is required by this Code, and

(b) that is consistent with,

  (i) a decision of the Building Code Commission in respect of a dispute described in clause 24 (1) (a) of the Act,

  (ii) an approval of the use of the material, system or *building* design in the whole of another province or territory in accordance with the law of that province or territory, or

  (iii) a revision of the National Building Code of Canada or the National Plumbing Code of Canada that has been approved by the Canadian Commission on Building and Fire Codes.

2.4.3. Interpretations By Minister

2.4.3.1. Interpretations By Minister

(1) Every interpretation issued by the *Minister* under section 28.1 of the Act shall be made available to the public,

(a) by posting the interpretation on the *Building Code website*, and

(b) by providing a written copy of the interpretation on receipt of a request for it.

O. Reg. 350/06, Division C, Part 2.

PART 3
QUALIFICATIONS

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Section 3.1. Qualifications for Chief Building Officials and Inspectors

3.1.1. Scope

3.1.1.1. Scope

(1) Except as provided in Sentence (2), this Section prescribes, for the purposes of subsections 15.11 (1), (2) and (3) of the Act,

(a) the qualifications that a person must satisfy to be appointed and to remain appointed as,

    (i) a *chief building official* under the Act, or

    (ii) an *inspector* who has the same powers and duties as a *chief building official* in relation to *plumbing*,

(b) the qualifications that a person must satisfy to be appointed and to remain appointed as,

(i) an *inspector* who has the same powers and duties as a *chief building official* in relation to *sewage systems*, or

(ii) an *inspector* whose duties include plans review or inspection under the Act of *sewage systems*, and

(c) the qualifications that a person must satisfy to be appointed and to remain appointed as an *inspector* under the Act, other than an *inspector* described in Subclause (a)(ii) or (b)(i) or (ii).

(2) The qualification requirements for *chief building officials* and *inspectors* in Sentence (1) do not apply to plan review and inspection of,

(a) site services including,

(i) surface drainage, and

(ii) *plumbing* located underground either outside a *building* or under a *building*,

(b) *construction* of a factory-built house certified to CAN/CSA-A277, "Procedure for Certification of Factory-Built Houses",

(c) *construction* of a mobile home conforming to CAN/CSA-Z240 Series, "Mobile Homes",

(d) *construction* of a park model trailer conforming to CAN/CSA-Z241 Series, "Park Model Trailers", or

(e) signs.

3.1.2. Chief Building Officials

3.1.2.1. Qualifications

(1) The following are prescribed as qualifications for a person to be appointed and to remain appointed under the Act as a *chief building official* or as an *inspector* who has the same powers and duties as a *chief building official* in relation to *sewage systems* or *plumbing*:

(a) the person shall successfully complete the examination program administered or authorized by the Ministry of Municipal Affairs and Housing relating to the person's knowledge of the Act and this Code and the powers and duties of *chief building officials*,

(b) if, under subsection 22 (2) of the Act, the person will also exercise any of the powers or perform any of the duties of an *inspector*, the person shall also have the qualifications contained in Sentence 3.1.4.1.(1), and

(c) the person shall file the information set out in Sentence 3.1.6.1.(1) with the *director* in a form established by the *director*.

(2) An *inspector* who has the same powers and duties as a *chief building official* in relation to *sewage systems* and who had, on August 31, 2003, the qualification described in Article 2.11.3.1. of Ontario Regulation 403/97 (Building Code), as it read on that day,

(a) shall be deemed to have successfully completed the examination program described in Clause (1)(a),

(b) shall be deemed to have successfully completed the examination program described in Clause 3.1.4.1.(1)(a) in the category of qualification described in Column 3 of Row 10 of Table 3.5.2.1., and

(c) shall be deemed to have filed with the *director* the information required in Clause (1)(c) if the person filed with the *director*, before the day this Article came into force, the information required under Article 2.11.3.1. of Ontario Regulation 403/97 (Building Code), as that Article read on August 31, 2003.

3.1.3. Supervisors and Managers

3.1.3.1. Qualifications

(1) The following are prescribed as the qualifications for a person to be appointed and to remain appointed under the Act as an *inspector* whose duties are solely the supervision or management of *inspectors*:

(a) the person shall successfully complete the examination program administered or authorized by the Ministry of Municipal Affairs and Housing of the person's knowledge of the Act and this Code and the powers and duties of *chief building officials*,

(b) the person shall successfully complete the examination program administered by the Ministry of Municipal Affairs and Housing of the person's knowledge of the Act and this Code related to any one category of qualification set out in Column 3 of Table 3.5.2.1., and

(c) the person shall file the information set out in Sentence 3.1.6.1.(1) with the *director* in a form established by the *director*.

3.1.4. Inspectors

3.1.4.1. Qualifications

(1) Except as provided in Article. 3.1.4.2., the following are prescribed as qualifications for a person to be appointed and to remain appointed under the Act as an *inspector* whose duties include plans review or inspection under the Act:

(a) the person shall successfully complete the examination program administered or authorized by the Ministry of Municipal Affairs and Housing relating to the person's knowledge of the Act and this Code in the category or categories of qualifications in Column 3 of Table 3.5.2.1. that correspond to the types of *buildings* set out in Column 4 of Table 3.5.2.1. in respect of which the person will exercise the powers or perform the duties of an *inspector* under the Act,

(b) the person shall file the information set out in Sentence 3.1.6.1.(1) with the *director* in a form established by the *director*.

(2) An *inspector* who had, on August 31, 2003, the qualification described in Article 2.11.3.1., of Ontario Regulation 403/97 (Building Code), as that Article read on August 31, 2003,

(a) shall be deemed to have successfully completed the examination program described in Clause (1)(a) in the category of qualification described in Column 3 of Row 10 of Table 3.5.2.1., and

(b) shall be deemed to have filed with the *director* the information required in Clause (1)(b) if the person filed with the *director*, before September 1, 2003, the information required under Article 2.11.3.1. of Ontario Regulation 403/97 (Building Code), as that Article read on August 31, 2003.

3.1.4.2. Qualifications for Intern Inspectors

(1) A person appointed under the Act as an intern *inspector* whose duties include supervised plans review or inspection under the Act is exempt from the requirements in Article 3.1.4.1. if,

(a) the person is enrolled in an internship program approved by the *Minister*, and

(b) the person is supervised by an *inspector* or *chief building official* who meets the category of qualification in respect of which the person will exercise the powers or perform the duties.

(2) An intern *inspector* described in Clause (1)(a) shall not issue orders under the Act except orders under subsections 12 (2) or 13 (1) of the Act.

(3) An intern *inspector* described in Clause (1)(a) shall not undertake a site inspection of a *building* related to a notice in respect of,

(a) substantial completion of footings and *foundations* prior to commencement of backfilling, or

(b) completion of *construction* and installation of components required to permit the issuance of an occupancy permit under Sentence 1.3.3.1.(2) or to permit occupancy under Sentence 1.3.3.2.(1), if the *building* or part of the *building* to be occupied is not fully completed.

3.1.5. Updating of Qualifications

3.1.5.1. Updating of Qualifications

(1) When an examination that is part of an examination program referred to in Clause 3.1.2.1.(1)(a), 3.1.3.1.(1)(a) or (b) or 3.1.4.1.(1)(a) or (b) is replaced with a new examination, the *director* shall give notice of the new examination to every person who has, pursuant to Clause 3.1.2.1.(1)(c), 3.1.3.1(1)(c) or 3.1.4.1.(1)(c), informed the *director* that the person completed the examination before it was replaced or who is deemed to have successfully completed the examination program.

(2) The *director* may give the notice referred to in Sentence (1) by sending it by regular letter mail to the last address of the person filed with the *director*.

(3) It is a prescribed qualification for the purposes of subsections 15.11 (1), (2) and (3) of the Act that, not later than 180 days after the day on which a notice referred to in Sentence (1) is sent, the person to whom the notice is given shall,

(a) successfully complete all new examinations referred to in the notice, and

(b) file the information set out in Sentence 3.1.6.1.(1) with the *director* in a form established by the *director*.

3.1.6. Information

3.1.6.1. Qualifications

(1) The information referred to in Clauses 3.1.2.1.(1)(c), 3.1.3.1.(1)(c), 3.1.4.1.(1)(c) and 3.1.5.1.(3)(b) is the following:

(a) the person's name, residence address and residential mailing address, if different from the residence address,

(b) the name and address of every *principal authority* that has appointed the person as a *chief building official* or *inspector* under the Act, and

(c) information about the examinations that the person has successfully completed, in such form and in such detail as may be required by the *director*.

(2) A person who files information under Sentence (1) with the *director* shall advise the *director* of any change of the information not later than 15 days after the change.

3.1.7. Fees

3.1.7.1. Fees

(1) The fee payable upon the filing of information under Clause 3.1.2.1.(1)(c), 3.1.3.1.(1)(c), 3.1.4.1.(1)(c) or 3.1.5.1.(3)(b) is $80.

(2) The amount of a fee referred to in Sentence (1) is reduced by $10 if the information is filed and the fee is paid in accordance with a means of electronic filing and payment specified by the *director*.

(3) The Ministry of Municipal Affairs and Housing may charge a fee to a person who takes an examination for the purposes of this Section.

3.1.8. Public Register

3.1.8.1. Public Register

(1) The *director* shall establish and maintain a register available to the public listing every person who has the qualifications required by subsections 15.11 (1), (2) and (3) of the Act and has been appointed as a *chief building official* or *inspector* by a *principal authority*.

(2) The register referred to in Sentence (1) shall contain the following information with respect to each person listed in it:

(a) the name of the person,

(b) any identifying number assigned by the *director* to that person,

(c) the name of each *principal authority* that has appointed the person as a *chief building official* or *inspector*, and

(d) the qualifications of the person.

3.1.9. Categories of Qualifications

3.1.9.1. Categories

(1) Table 3.5.2.1. contains the categories of qualifications for the purposes of this Section.

Section 3.2. Qualifications for Designers

3.2.1. Scope

3.2.1.1. Scope

(1) This Section prescribes, for the purposes of clause 8 (2) (c) and subsection 15.11 (5) of the Act, the qualifications for a person who carries out *design activities* after December 31, 2005.

3.2.2. General

3.2.2.1. Persons Engaged in the Business of Providing Design Activities to the Public

(1) Every person engaged in the business of providing *design activities* to the public, other than a person who is the holder of a Certificate of Practice or a Temporary Licence issued under the *Architects Act*, must have the qualification set out in Sentence 3.2.4.1.(1).

3.2.2.2. Other Designers

(1) Every person who carries out *design activities*, other than an *architect*, must have the qualifications set out in Sentence 3.2.5.1.(1) if the person is not required to have the qualification set out in Sentence 3.2.4.1.(1).

3.2.3. Definition

3.2.3.1. Definition

(1) In this Section,

registered means registered under Article 3.2.4.2.

3.2.4. Qualifications – Persons Engaged in the Business of Providing Design Activities to the Public

3.2.4.1. General

(1) Except as provided in Sentences (3) and (4), every person engaged in the business of providing *design activities* to the public must have the following qualification:

(a) the person must be *registered* with the *director*.

(2) A registration shall be in a form established by the *director*.

(3) A person is exempt from the requirement to comply with the qualification in Sentence (1) if the person's *design activities* relate only to,

(a) *construction* of a home as defined under the *Ontario New Home Warranties Plan Act* that will be constructed or sold by that person, if the person is a builder or vendor as defined in that Act and is registered under that Act,

(b) *construction* of a *building* that is owned by that person,

(c) *construction* of a *farm building* that is,

  (i) of *low human occupancy*,

  (ii) of 2 *storeys* or less in *building height*, and

  (iii) has a *building area* of less than 600 m^2,

(d) the extension, material alteration or repair of a detached house, semi-detached house, townhouse or row house containing not more than two *dwelling units* in each house,

(e) a *sewage system* to be constructed by that person if the person is *registered* under Article 3.3.3.2.,

(f) *construction* of tents described in Sentence 3.14.1.2.(2) in Division B,

(g) *construction* of signs,

(h) *construction* of site services, including,

  (i) surface drainage, and

  (ii) *plumbing* located underground, either outside a *building* or under a *building*,

(i) *construction* of a factory-built house certified to CAN/CSA-A277, "Procedure for Certification of Factory-Built Houses",

(j) *construction* of a mobile home conforming to CAN/CSA-Z240 Series, "Mobile Homes",

(k) *construction* of a park model trailer conforming to CAN/CSA-Z241 Series, "Park Model Trailers",

(l) *construction* of pre-engineered elements of a *building* if the design of the elements is carried out by a person competent in the specific discipline appropriate to the circumstances,

(m) *construction* of appliances, equipment and similar incidental components of a *building*, or

(n) *construction* of a *building* for which a permit under section 8 of the Act is applied for or issued before January 1, 2006 and for which *construction* is commenced within six months after the permit is issued.

(4) A person is exempt from the requirements to comply with the qualification in Sentence (1) if the person's *design activities* are with respect to a detached house, semi-detached house, townhouse or row house containing not more than two *dwelling units* in each house and the *design activities* relate only to

(a) a *plumbing* system,

(b) a heating, ventilation and *air conditioning* system, or

(c) ancillary *buildings* such as garages.

3.2.4.2. Registration and Renewal of a Registration

(1) Subject to Article 3.2.4.9., the *director* may register an applicant, or renew a registration, in each class of registration applied for, if,

(a) the applicant or *registered* person or, if the applicant or *registered* person is a corporation or partnership, a director, officer, partner or employee of the applicant or *registered* person, has successfully completed the examination program administered or authorized by the Ministry of Municipal Affairs and Housing relating to the person's knowledge of the Act and this Code in the category of qualification set out on Column 3 of Table 3.5.2.1. that corresponds to each class of registration set out in Column 2 of Table 3.5.2.1. for which application is made,

(b) all persons who will review and take responsibility for *design activities* provided to the public by the applicant or *registered* person for the purposes of Clause 3.2.4.7.(1)(d) have successfully completed the examination program administered or authorized by the Ministry of Municipal Affairs and Housing relating to the person's knowledge of the Act and this Code in the category of qualification set out on Column 3 of Table 3.5.2.1. that correspond to each class of registration set out in Column 2 of Table 3.5.2.1. for which application is made,

(c) the applicant or *registered* person is covered by the insurance required under Subsection 3.6.2. during the term of the registration applied for,

(d) the application is complete, and

(e) all fees required under Article 3.2.4.5. are paid.

3.2.4.3. Application for Registration or Renewal of a Registration

(1) An application for registration or renewal of a registration shall be made to the *director* in a form established by the *director*.

(2) An application for renewal of a registration shall be made at least 60 days before the expiry of the registration to be renewed.

(3) An application for registration or renewal of a registration shall include an undertaking by the applicant or *registered* person to comply with the conditions set out in Article 3.2.4.7.

(4) If a partnership or a corporation is the applicant for registration or renewal of registration, the application shall set out the names and residence addresses of all of its partners, directors or officers, as the case may be.

(5) An application for registration or renewal of a registration shall contain the names of all partners, directors, officers or employees of the applicant or *registered* person, as the case may be, and all other persons engaged by the applicant or *registered* person who,

(a) have the qualifications set out in Clause 3.2.4.2.(1)(a) in the class or classes of registration for which the application is made, and

(b) have the qualifications set out in Clause 3.2.4.2.(1)(b) and will review and take responsibility for the *design activities* provided to the public by the applicant or *registered* person in the class or classes of registration for which the application is made.

(6) An application for registration or renewal of a registration shall contain evidence, provided by the applicant or *registered* person, that the persons referred to in Sentence (5) meet the qualifications set out in Clauses 3.2.4.2.(1)(a) and (b).

(7) An application for registration or renewal of a registration shall contain evidence, provided by the applicant or *registered* person, that the applicant or *registered* person is covered by the insurance required under Subsection 3.6.2. during the term of the registration applied for.

3.2.4.4. Term

(1) A registration expires one year after it is issued but the *director* may, for the purposes of staggering the renewal dates of the registrations, issue the initial registration for a term of not less than 90 days and not more than 18 months.

3.2.4.5. Fees

(1) The fee for a registration is $125.

(2) The fee for a *registered* person to add a new class of registration is $25.

(3) The fee for renewal of a registration is $80.

(4) The amount of a fee referred to in Sentence (1), (2) or (3) is reduced by 15 per cent and rounded to the nearest whole dollar if the application is made and the fee is paid in accordance with a means of electronic filing and payment specified by the *director*.

(5) The Ministry of Municipal Affairs and Housing may charge a fee to a person who takes an examination for the purposes of this Subsection.

3.2.4.6. Not Transferable

(1) A registration is not transferable.

3.2.4.7. Conditions

(1) The following are the conditions of a registration:

(a) the *registered* person shall carry out *design activities* only in respect of the type of *building* described in Column 4 of Table 3.5.2.1. that correspond to the class or classes of registration held by the *registered* person,

(b) if the *registered* person is a corporation or partnership, there must throughout the term of the registration be an officer, director, partner or employee of the *registered* person who has the qualifications set out in Clause 3.2.4.2.(1)(a) for each class of registration set out in Column 2 of Table 3.5.2.1. that is held by the *registered* person,

(c) not more than 180 days after the day a notice is given under Sentence 3.2.4.8.(1) by the *director* to the *registered* person, the *registered* person shall,

(i) ensure that the *registered* person and the persons described in Clause (b) have successfully completed all new examinations referred to in the notice, and

(ii) provide the following information to the *director*:

(A) the names of all persons described in Subclause (i), and

(B) information about the examinations that the persons described in Subclause (i) have successfully completed, in such form and in such detail as may be required by the *director*,

(d) the *registered* person shall ensure that a person described in Clause (b) or another person who has the qualifications set out in Clause 3.2.4.2.(1)(b) in respect of the class of registration set out in Column 2 of Table. 3.5.2.1. to which the *design activities* relate will review and take responsibility for *design activities* in each class of registration that are provided to the public by the *registered* person,

(e) not more than 180 days after the day when a notice is given under Sentence 3.2.4.8.(1) by the *director* to the *registered* person, the *registered* person shall,

(i) ensure that persons described in Clause (d) who will review and take responsibility for *design activities* provided to the public by the *registered* person in the class of registration to which the notice relates, have successfully completed all new examinations referred to in the notice, and

(ii) provide the following information to the *director*:

(A) the names of all persons described in Subclause (i), and

(B) information about the examinations that the persons referred to in Subclause (i) have successfully completed, in such form and in such detail as may be required by the *director*,

(f) the *registered* person shall ensure that a person described in Clause (d) who reviews and takes responsibility for *design activities* provided to the public by the *registered* person shall include the following information on any document submitted to a *chief building official* or *registered code agency* in the circumstances set out in subsection 15.11 (5) of the Act:

(i) the name of the *registered* person and any registration number issued to the *registered* person by the *director*,

(ii) a statement that the person has reviewed and taken responsibility for the *design activities*,

(iii) the person's name and any identifying number issued to the person by the *director* in respect of the qualifications described in Clause 3.2.4.2.(1)(b), and

(iv) the person's signature,

(g) the *registered* person shall, during the term of the registration, be covered by the insurance required under Subsection 3.6.2.,

(h) the *registered* person shall, within 15 days after the event, notify the *director* in writing of,

(i) any change in address of the *registered* person for correspondence relating to the registration, and

(ii) any change in the information set out in Sentences 3.2.4.3.(4) and (5),

(i) the *registered* person shall give prompt written notice to the *director* of any material change in any of the information, other than the information referred to in Clause (h), that is contained in or accompanies an application for registration or renewal of a registration,

(j) the *registered* person shall, from time to time, at the *registered* person's expense, give the *director* such documents or information relating to the registration or to activities carried out under the registration as the *director* may reasonably require,

(k) the *registered* person shall allow the representatives of the *director* access to the *registered* person's books and records during normal business hours for the purpose of confirming matters related to the registration.

3.2.4.8. Updating of Qualifications

(1) Where an examination referred to in Clause 3.2.4.2.(1)(a) or (b) is replaced with a new examination, the *director* shall give notice of the new examination to every *registered* person who is registered in a class of registration to which the new examination relates.

(2) The *director* may give the notice referred to in Sentence (1) by sending it by regular letter mail to the last address of the *registered* person that has been provided to the *director*.

3.2.4.9. Suspension, Revocation, Refusal to Register or Renew a Registration

(1) The *director* may, in the circumstances set out in Sentence (2),

(a) refuse to *register* an applicant or to renew a registration, or

(b) suspend or revoke a registration.

(2) The circumstances referred to in Sentence (1) are,

(a) the *registered* person is in contravention of the Act or this Code,

(b) the *registered* person is in breach of a condition of the registration other than the condition set out in Clause 3.2.4.7.(1)(g),

(c) the registration was issued on the basis of mistaken, false or incorrect information,

(d) the *director* is of the opinion that the past conduct of the applicant or *registered* person or, if the applicant or *registered* person is a partnership or a corporation, the partners, officers or directors of the *registered* person, as the case may be, affords reasonable grounds for belief that the business that would be or is authorized by the registration will not be carried on in accordance with law,

(e) the application is incomplete, or

(f) any fees required under Article 3.2.4.5. remain unpaid.

(3) If the *director* proposes to refuse to register or renew a registration or proposes to suspend or revoke a registration under Sentence (1), the *director* shall serve a notice of the proposal, together with the reasons for it, on the applicant or *registered* person.

(4) A notice under Sentence (3) shall state that the applicant or *registered* person is entitled to a hearing before the *Tribunal* if the applicant or *registered* person, within 15 days after service of the notice referred to in Sentence (3), serves the *director* and the *Tribunal* with notice in writing requesting a hearing.

(5) If the applicant or *registered* person does not request a hearing by the *Tribunal* in accordance with Sentence (4), the *director* may carry out the proposal stated in the notice under Sentence (3).

(6) If the applicant or *registered* person requests a hearing before the *Tribunal* in accordance with Sentence (4), the *Tribunal* shall appoint a time for and hold a hearing and may by order direct the *director* to carry out the *director's* proposal or refrain from carrying it out and to take such other action as the *Tribunal* considers the *director* ought to take in accordance with the Act and this Code, and for those purposes the *Tribunal* may substitute its opinion for that of the *director*.

(7) The *director*, the applicant or *registered* person who requested the hearing, and such other persons as the *Tribunal* may specify, are parties to proceedings before the *Tribunal*.

(8) Sentences (3) to (7) do not apply and the *director* may cancel the registration of a *registered* person upon receipt of a request in writing for cancellation from the *registered* person in a form established by the *director*.

(9) If, within the time period set out in Sentence 3.2.4.3.(2), *registered* person has applied for renewal of a registration, paid the fee required under Article 3.2.4.5. and provided evidence satisfactory to the *director* that the *registered* person is covered by insurance required under Subsection 3.6.2. for the term of the renewal of the registration, the registration shall be deemed to continue until the earliest of,

(a) the day the registration is renewed,

(b) if the *registered* person is served with notice that the *director* proposes to refuse to renew the registration, the day the time for giving notice requesting a hearing expires or, if a hearing is held, the day the *Tribunal* makes its order, and

(c) the day when the *registered* person ceases to be covered by the insurance required under Subsection 3.6.2.

3.2.4.10. Mandatory Suspension or Revocation of Registration or Refusal to Register or Renew Registration

(1) The *director* shall, in the circumstances set out in Sentence (2),

(a) refuse to register an applicant,

(b) refuse to renew a registration, or

(c) suspend or revoke a registration.

(2) The circumstances referred to in Sentence (1) are that,

(a) the applicant or *registered* person is not covered by the insurance required under Subsection 3.6.2., or

(b) an order under subsection 69 (2) of the *Provincial Offences Act* is in effect directing that the registration of the person be suspended and no registration be issued to the person until a fine is paid.

(3) If the *director* refuses to register an applicant, refuses to renew a registration or suspends or revokes a registration under Sentence (1), the *director* shall serve a notice of the refusal, suspension or revocation, together with the reasons for it, on the *registered* person.

(4) A suspension or revocation of a registration under Sentence (1) takes effect immediately and the commencement of a proceeding before the *Tribunal* does not stay the operation of the suspension or revocation of the registration.

(5) A notice under Sentence (3) shall state that the *registered* person is entitled to a hearing before the *Tribunal* if the *registered* person, within 15 days after service of the notice referred to in Sentence (3), serves the *director* and the *Tribunal* with notice in writing requesting a hearing.

(6) The *Tribunal* may, on the application of the *registered* person, stay the operation of a decision of the *director* to suspend or revoke the registration and may grant the stay subject to conditions.

(7) If a *registered* person requests a hearing before the *Tribunal* in accordance with Sentence (5), the *Tribunal* shall appoint a time for and hold a hearing and may by order confirm, alter or revoke the decision of the *director* to refuse to register or to suspend or revoke the registration, as the case may be, and may take such action as the *Tribunal* considers the *director* ought to take in accordance with the Act and this Code, and for those purposes the *Tribunal* may substitute its opinion for that of the *director*.

(8) The *director* and the *registered* person who requested the hearing, and such other persons as the *Tribunal* may specify, are parties to proceedings before the *Tribunal*.

3.2.5. Qualifications – Other Designers

3.2.5.1. General

(1) Except as provided in Sentence (2), a person who carries out *design activities* but is not required under Sentence 3.2.4.1.(1) to be *registered* with the *director* must have the following qualifications:

(a) he or she shall successfully complete the examination program administered or authorized by the Ministry of Municipal Affairs and Housing relating to his or her knowledge of the Act and this Code in the category of qualification set out in Column 3 of Table 3.5.2.1. that corresponds to the type of *buildings* described in Column 4 of Table 3.5.2.1. for which the person carries out *design activities*,

(b) he or she shall file the information set out in Sentence 3.2.5.3.(1) with the *director* in a form established by the *director*, and

(c) he or she shall include the following information on any document respecting *design activities* that the person has reviewed and taken responsibility for and that is submitted to a *chief building official* or *registered code agency* in the circumstances set out in subsection 15.11 (5) of the Act:

  (i) the person's name and any identifying number issued to the person issued by the *director* in respect of the qualifications described in Clause (a),

  (ii) a statement that the person has reviewed and taken responsibility for the *design activities*, and

  (iii) the person's signature.

(2) A person is exempt from the requirement to comply with the qualifications in Sentence (1) if his or her *design activities* relate only to,

(a) *design activities* in respect of which a person described in Clause 3.2.4.7.(1)(d) or who has the qualifications required under Sentence (1) will review and take responsibility,

(b) *construction* of,

  (i) a detached house, semi-detached house, townhouse or row house owned by the person and containing not more than two *dwelling units* in each house, or

  (ii) an ancillary *building* that serves a *building* described in Subclause (i),

(c) *construction* of a *farm building* that,

  (i) is of *low human occupancy*,

  (ii) is 2 *storeys* or less in *building height*, and

  (iii) has a *building area* of less than 600 m^2 ,

(d) a *sewage system* to be *constructed* by that person and,

  (i) the person is *registered* under Article 3.3.3.2., or

  (ii) the *sewage system* is owned by the person,

(e) *construction* of tents described in Sentence 3.14.1.2.(2) in Division B,

(f) *construction* of signs,

(g) *construction* of site services including,

  (i) surface drainage, and

  (ii) *plumbing* located underground either outside a *building* or under a *building*,

(h) *construction* of pre-engineered elements of a *building* provided that the design of the elements is carried out by a person competent in the specific discipline appropriate to the circumstances,

(i) *construction* of appliances, equipment and similar incidental components of a *building*,

(j) *construction* of an ancillary *building*,

  (i) that serves a detached house, semi-detached house, townhouse or row house if the house contains not more than two *dwelling units*, and

  (ii) that does not exceed 50 m^2 *building area*, or

(k) *construction* of a *building* for which a permit under section 8 of the Act is applied for or issued before January 1, 2006 and for which *construction* commences within six months after the permit is issued.

3.2.5.2. Updating of Qualifications

(1) When an examination that is part of an examination program referred to in Clause 3.2.5.1.(1)(a) is replaced with a new examination, the *director* shall give notice of the new examination to every person who has, pursuant to Clause 3.2.5.1.(1)(b), informed the *director* that he or she has completed the examination before its replacement.

(2) The *director* may give the notice referred to in Sentence (1) by sending it by regular letter mail to the last address of the person that has been filed with the *director*.

(3) It is a prescribed qualification for the purposes of clause 8 (2) (c) and subsection 15.11 (5) of the Act that, not more than 180 days after the day on which the notice referred to in Sentence (1) is given, the person to whom the notice is given shall,

(a) successfully complete all new examinations referred to in the notice, and

(b) file the information set out in Sentence 3.2.5.3.(1) with the *director* in a form established by the *director*.

3.2.5.3. Information

(1) The information referred to in Clauses 3.2.5.1.(1)(b) and 3.2.5.2.(3)(b) is the following:

(a) the person's name, residence address and residential mailing address, if different from the residence address, and

(b) information about the examinations that the person has successfully completed, in such detail as may be required by the *director*.

(2) A person who has filed information under Sentence (1) with the *director* shall advise the *director* of any change of address within 15 days of the change.

3.2.5.4. Fees

(1) The fee payable upon the filing of information referred to in Clauses 3.2.5.1.(1)(b) or 3.2.5.2.(3)(b) is $80.

(2) The amount of a fee referred to in Sentence (1) is reduced by $10 if the information is filed and the fee is paid in accordance with a means of electronic filing and payment specified by the *director*.

(3) The Ministry of Municipal Affairs and Housing may charge a fee to a person who takes an examination for the purposes of this Section.

3.2.6. Public Register

3.2.6.1. Public Register

(1) The *director* shall establish and maintain a register available to the public that lists every person who has the qualifications required by clause 8 (2) (c) and subsection 15.11 (5) of the Act.

(2) The register referred to in Sentence (1) shall contain the following information in respect of every *registered* person:

(a) the name of the *registered* person,

(b) any identifying number assigned by the *director* to the *registered* person,

(c) the business address of the *registered* person,

(d) classes of registration of the *registered* person,

(e) the names of the person or persons who will review and take responsibility for *design activities* carried out by the *registered* person in each class of registration, and

(f) any identifying number assigned by the *director* to the person or persons referred to in Clause (e).

(3) The register referred to in Sentence (1) shall contain the following information in respect of persons who have the qualifications referred to in Sentence 3.2.5.1.(1):

(a) the name of the person,

(b) any identifying number assigned by the *director* to the person,

(c) the qualifications of that person.

3.2.7. Classes of Registration and Categories of Qualifications

3.2.7.1. Classes and Categories

(1) Table 3.5.2.1. contains the classes of registration and categories of qualifications for the purposes of this Section.

Section 3.3. Qualifications for Persons Engaged in the Business of Constructing On Site, Installing, Repairing, Servicing, Cleaning or Emptying Sewage Systems

3.3.1. Scope

3.3.1.1. Scope

(1) This Section prescribes, for the purposes of subsection 15.12 (1) of the Act, the qualifications for persons engaged in the business of *constructing* on site, installing, repairing, servicing, cleaning or emptying *sewage systems.*

3.3.2. Definition

3.3.2.1. Definition

(1) In this Section,

registered means registered under Article 3.3.3.2.

3.3.3. Qualifications

3.3.3.1. General

(1) Commencing on the day this Section comes into force, persons engaged in the business of *constructing* on site, installing, repairing, servicing, cleaning or emptying *sewage systems* shall have the following qualification:

(a) the person must be *registered* with the *director.*

(2) A registration shall be in a form established by the *director.*

(3) A person is exempt from the requirement to comply with the qualification in Sentence (1) in respect of the activities of cleaning and emptying *sewage systems* if the person has been issued a certificate of approval under section 39 of the *Environmental Protection Act* in respect of the activities of cleaning and emptying *sewage systems.*

3.3.3.2. Registration and Renewal of a Registration

(1) Subject to Article 3.3.3.9., the *director* may register an applicant, or renew a *registered* person's registration, if,

(a) all persons who will supervise *construction* on site, installation, repair, servicing, cleaning or emptying *sewage systems* carried out by the applicant or *registered* person have successfully completed the examination program administered or authorized by the Ministry of Municipal Affairs and Housing relating to the person's knowledge of the Act, this Code and the *construction*, maintenance and operation of *sewage systems,*

(b) the application is complete, and

(c) all fees required under Article 3.3.3.5. are paid.

(2) A person who had, on August 31, 2003, the qualification described in Clause 2.12.4.6.(1)(a) of Ontario Regulation 403/97 (Building Code), as it read on that day, shall be deemed to have successfully completed the examination program described in Clause (1)(a).

3.3.3.3. Application for Registration or Renewal of a Registration

(1) An application for registration or renewal of a registration shall be made to the *director* in a form established by the *director.*

(2) An application for renewal of a registration shall be made at least 60 days before the expiry of the registration to be renewed.

(3) An application for registration or renewal of a registration shall include an undertaking by the applicant or *registered* person to comply with the conditions set out in Article 3.3.3.7.

(4) If a partnership or a corporation is the applicant for registration or renewal of a registration, the application shall set out the names and residence addresses of all its partners, directors or officers, as the case may be.

(5) An application for registration or renewal of a registration shall contain the names of all partners, directors, officers or employees of the applicant or *registered* person, as the case may be, and all other persons who have been engaged by the applicant or *registered* person, who,

(a) have the qualifications set out in Clause 3.3.3.2.(1)(a), and

(b) will supervise the *construction* on site, installation, repair, servicing, cleaning or emptying of *sewage systems* to be carried out by the applicant or *registered* person.

(6) An application for registration or renewal of a registration shall contain evidence, provided by the applicant or *registered* person, that the persons referred to in Sentence (5) meet the qualifications set out in Clause 3.3.3.2.(1)(a).

3.3.3.4. Term

(1) A registration expires 3 years after the date of its issuance.

3.3.3.5. Fees

(1) The fee for a registration or renewal of a registration is $50.

(2) The amount of a fee referred to in Sentence (1) is reduced by $5 if the application is made and the fee is paid in accordance with a means of electronic filing and payment specified by the *director*.

(3) The Ministry of Municipal Affairs and Housing may charge a fee to a person who takes an examination for the purposes of this Section.

3.3.3.6. Not Transferable

(1) A registration is not transferable.

3.3.3.7. Conditions

(1) The following are the conditions of a registration:

(a) the *registered* person shall ensure that the *construction* on site, installation, repair, servicing, cleaning or emptying of *sewage systems* carried out by the *registered* person is supervised by a person who has the qualifications set out in Clause 3.3.3.2.(1)(a),

(b) not more than 180 days after the day a notice is given under Sentence 3.3.3.8.(1) by the *director* to the *registered* person, the *registered* person shall,

  (i) ensure that the *construction* on site, installation, repair, servicing, cleaning or emptying of *sewage systems* carried out by the *registered* person is supervised by persons who have successfully completed the new examinations referred to in the notice, and

  (ii) provide the following information to the *director*:

    (A) the name of the person or persons carrying out the supervision, and

    (B) information about the examinations that the person or persons have successfully completed, in such detail as may be required by the *director*,

(c) the *registered* person shall, within 15 days after the event, notify the *director* in writing,

  (i) of any change in address of the *registered* person for correspondence relating to the registration, and

  (ii) of any change in the information set out in Sentences 3.3.3.3.(4) and (5),

(d) the *registered* person shall give prompt written notice to the *director* of any material change in any of the information other than the information referred to in Clause (1)(c) that is contained in or accompanies an application for registration or renewal of a registration,

(e) the *registered* person shall, from time to time, at the *registered* person's expense, give the *director* such documents or information relating to the registration or to activities carried out under the registration as the *director* may reasonably require, and

(f) the *registered* person shall allow the representatives of the *director* access to the *registered* person's books and records during normal business hours for the purpose of confirming matters related to the registration.

3.3.3.8. Updating of Qualifications

(1) When an examination that is part of an examination program referred to in Clause 3.3.3.2.(1)(a) is replaced with a new examination, the *director* shall give notice of the new examination to every *registered* person.

(2) The *director* may give the notice referred to in Sentence (1) by sending it by regular letter mail to the last address of the *registered* person that has been provided to the *director*.

3.3.3.9. Suspension, Revocation, Refusal to Register or Renew a Registration

(1) The *director* may, in the circumstances set out in Sentence (2),

(a) refuse to register an applicant or renew a registration, or

(b) suspend or revoke a registration.

(2) The circumstances referred to in Sentence (1) are,

(a) the *registered* person is in contravention of the Act or this Code,

(b) the *registered* person is in breach of a condition of the registration,

(c) the registration was issued on the basis of mistaken, false or incorrect information,

(d) the *director* is of the opinion that the past conduct of the applicant or *registered* person or, if the applicant or *registered* person is a partnership or a corporation, the partners, officers or directors of the *registered* person, as the case may be, affords reasonable grounds for belief that the business that would be or is authorized by the registration will not be carried on in accordance with law,

(e) an order under subsection 69 (2) of the *Provincial Offences Act* is in effect directing that the registration of the person be suspended and that no registration be issued to that person until a fine is paid,

(f) the application is incomplete, or

(g) any fees required under Article 3.3.3.5. remain unpaid.

(3) If the *director* proposes to refuse to register or renew a registration or proposes to suspend or revoke a registration, the *director* shall serve a notice of the proposal, together with the reasons for it, on the applicant or *registered* person.

(4) A notice under Sentence (3) shall state that the applicant or *registered* person is entitled to a hearing before the *Tribunal* if the applicant or *registered* person, within 15 days after service of the notice referred to in Sentence (3), serves the *director* and the *Tribunal* with notice in writing requesting a hearing.

(5) If an applicant or *registered* person does not request a hearing by the *Tribunal* in accordance with Sentence (4), the *director* may carry out the proposal stated in the notice under Sentence (3).

(6) If an applicant or *registered* person requests a hearing before the *Tribunal* in accordance with Sentence (4), the *Tribunal* shall appoint a time for and hold a hearing and may by order direct the *director* to carry out the *director's* proposal or refrain from carrying it out and to take such other action as the *Tribunal* considers the *director* ought to take in accordance with the Act and this Code, and for such purposes the *Tribunal* may substitute its opinion for that of the *director*.

(7) The *director*, the applicant or *registered* person who requested the hearing, and such other persons as the *Tribunal* may specify, are parties to proceedings before the *Tribunal*.

(8) Sentences (3) to (7) do not apply and the *director* may cancel the registration of a *registered* person upon receipt of a request in writing for cancellation from the *registered* person in a form established by the *director*.

(9) If, within the time period set out in Sentence 3.3.3.3.(2), a *registered* person has applied for renewal of a registration and paid the fee required under Article 3.3.3.5., the registration shall be deemed to continue until the earlier of,

(a) the day the registration is renewed, and

(b) if the *registered* person is served with notice that the *director* proposes to refuse to renew the registration, the day the time for giving notice requesting a hearing expires or, if a hearing is held, until the day the *Tribunal* makes its order.

3.3.4. Public Register

3.3.4.1. Public Register

(1) The *director* shall establish and maintain a register available to the public listing every person who has the qualifications required by subsection 15.12 (1) of the Act.

(2) The register referred to in Sentence (1) shall contain the following information with respect to every *registered* person:

(a) the name of the *registered* person,

(b) any identifying number assigned by the *director* to the *registered* person,

(c) the business address of the *registered* person,

(d) the names of the person or persons who will supervise the *construction* on site, installation, repair, servicing, cleaning or emptying *sewage systems* carried out by the *registered* person, and

(e) any identifying number assigned by the *director* to the persons referred to in Clause (d).

Section 3.4. Qualifications for Registered Code Agencies

3.4.1. Scope

3.4.1.1. Scope

(1) This Section prescribes, for the purposes subsection 15.11 (4) of the Act, the qualifications that a person must meet in order to be eligible to be appointed after June 30, 2005 as a *registered code agency* under the Act.

3.4.2. Definition

3.4.2.1. Definition

(1) In this Section,

registered means registered under Article 3.4.3.2.

3.4.3. Qualifications

3.4.3.1. General

(1) The following are prescribed as qualifications for persons to be appointed under the Act as a *registered code agency*:

(a) the person must be *registered* with the *director*.

(2) A registration shall be in a form established by the *director*.

3.4.3.2. Registration and Renewal of a Registration

(1) Subject to Article 3.4.3.9., the *director* may register an applicant, or renew a *registered* person's registration, in each class of registration applied for if,

(a) the applicant or *registered* person or, if the applicant or *registered* person is a corporation or partnership, a director, officer, partner or employee of the applicant or *registered* person, has successfully completed the examination program administered or authorized by the Ministry of Municipal Affairs and Housing relating to the person's knowledge of the Act and this Code and the powers and duties of a *registered code agency*,

(b) the applicant or *registered* person or, if the applicant or *registered* person is a corporation or partnership, one or more directors, officers, partners or employees of the applicant or *registered* person, have successfully completed the examination program administered or authorized by the Ministry of Municipal Affairs and Housing relating to the person's knowledge of the Act and this Code in the category of qualification set out in Column 2 of Table 3.5.2.2. that corresponds to each class of registration set out in Column 1 of Table 3.5.2.2. for which application is made,

(c) all persons who will carry out plans review and inspection activities on behalf of the *registered code agency* have the qualifications set out in Clause (b) in respect of each class of registration for which application is made,

(d) the applicant or *registered* person has in place a quality management plan referred to in Sentence 3.4.3.3.(3) for carrying out the activities of the applicant or *registered* person under the registration that is acceptable to the *director*,

(e) the applicant or *registered* person is covered by the insurance required under Subsection 3.6.2. during the term of the registration applied for,

(f) the application is complete, and

(g) all fees required under Article 3.4.3.5. are paid.

3.4.3.3. Application for Registration or Renewal of a Registration

(1) An application for registration or renewal of a registration shall be made to the *director* in a form established by the *director*.

(2) An application for renewal of a registration shall be made at least 60 days before the expiry of the registration being renewed.

(3) An application for registration or renewal of a registration shall include a quality management plan for carrying out the activities of the applicant or *registered* person under the registration, including, without limitation,

(a) procedures relating to the commencement of activities as a *registered code agency*, including procedures to verify that the applicant or *registered* person is qualified to undertake the activities and to verify that there exists no conflict of interest within the meaning of Sentence 3.7.3.1.(4),

(b) identification of the responsibilities of persons who will carry out plans review and inspection activities of the applicant or *registered* person and procedures for the supervision of those persons,

(c) procedures for assessing plans and specifications for conformity with this Code, including procedures for the assessment of *alternative solutions*,

(d) procedures for inspecting the *construction* of *buildings*,

(e) procedures for receipt of notices that *construction* is ready for inspection and of written reports from *architects* and *professional engineers* arising out of the general review of the *construction* of *buildings*,

(f) procedures for the issuance of certificates and orders under the Act, including the responsibility of the persons with the qualifications set out in Sentences 3.7.5.3.(1) and (2),

(g) procedures for referral of matters to a *chief building official* under subsection 14 (5) of the Act,

(h) procedures for participation of the applicant or *registered* person in proceedings before the Building Code Commission under section 24 of the Act and before the Superior Court of Justice under section 25 of the Act,

(i) procedures for documenting the activities of the applicant or *registered* person under the registration, including data control, records retention and the maintenance of security and confidentiality of records, and transferring records to the *principal authority*,

(j) procedures for training and supervision of personnel, and

(k) procedures for the review and up-dating of the quality management plan.

(4) An application for registration or renewal of a registration shall include an undertaking by the applicant or *registered* person to comply with the conditions set out in Article 3.4.3.7.

(5) If a partnership or a corporation is the applicant for registration or renewal of a registration, an application for registration or renewal of a registration shall set out the names and residence addresses of all its partners, directors or officers, as the case may be.

(6) An application for registration or renewal of a registration shall contain the names of all partners, directors, officers or employees of the applicant or *registered* person, as the case may be, and all other persons who have been engaged by the applicant or *registered* person, who,

(a) have the qualifications set out in Clauses 3.4.3.2.(1)(a) and (b), and

(b) have the qualifications set out in Clauses 3.4.3.2.(1)(b) and (c) and will exercise powers and perform functions under the Act on behalf of the applicant or *registered* person.

(7) An application for registration or renewal of a registration shall contain evidence, provided by the applicant or *registered person*, that the persons referred to in Sentence (6) meet the qualifications set out in Clauses 3.4.3.2.(1)(a) to (c).

(8) An application for registration or renewal of a registration shall contain evidence, provided by the applicant or *registered* person, that the applicant or *registered* person is covered by the insurance required under Subsection 3.6.2. during the term of the registration applied for.

3.4.3.4. Term

(1) A registration expires one year after the date of its issuance.

3.4.3.5. Fees

(1) The fee for registration is $300.

(2) The fee for the addition of a new class of registration is $50.

(3) The fee for renewal of a registration is $220.

(4) The amount of a fee referred to in Sentence (1), (2) or (3) is reduced by 15 per cent and rounded to the nearest whole dollar if the application is made and the fee is paid in accordance with a means of electronic filing and payment specified by the *director*.

(5) The Ministry of Municipal Affairs and Housing may charge a fee to a person who takes an examination for the purposes of this Section.

3.4.3.6. Not Transferable

(1) A registration is not transferable.

3.4.3.7. Conditions

(1) The following are the conditions of a registration:

(a) the *registered* person shall carry out activities under the registration in accordance with the Act, this Code and the quality management plan referred to in Clause 3.4.3.2.(1)(d),

(b) if the *registered* person is a corporation or partnership, during the term of the registration there must be,

  (i) an officer, director, partner or employee of the *registered* person who has the qualifications set out in Clause 3.4.3.2.(1)(a), and

  (ii) one or more officers, directors, partners or employees of the *registered* person who have the qualifications set out in Clause 3.4.3.2.(1)(b) in respect of each class of registration that is held by the *registered* person,

(c) not more than 180 days after the day a notice is given under Sentence 3.4.3.8.(1) by the *director* to the *registered* person, the *registered* person shall,

  (i) ensure that the persons referred to in Clause (1)(b) have successfully completed the new examinations referred to in the notice, and

(ii) provide to the *director* the names of the persons and information about the examinations that the persons have successfully completed, in such detail as may be required by the *director*,

(d) the *registered* person shall during the term of the registration, be covered by the insurance required by Subsection 3.6.2.,

(e) the *registered* person shall, within 15 days after the event, notify the *director* in writing,

(i) of any change in address of the *registered* person for correspondence relating to the registration, and

(ii) of any change in the information set out in Sentences 3.4.3.3.(5) and (6) ,

(f) the *registered* person shall give prompt written notice to the *director* of any material change in any of the information, other than the information referred to in Clause (e) that is contained in or accompanies an application for registration or renewal of a registration,

(g) the *registered* person shall, from time to time, at the *registered* person's expense, give to the *director* such documents or information relating to the registration of the *registered* person or to activities carried out under the registration as the *director* may reasonably require,

(h) the *registered* person shall allow the representatives of the *director* access to the *registered* person's books and records during normal business hours for the purpose of confirming matters related to the registration.

3.4.3.8. Updating of Qualifications

(1) Where an examination in an examination program referred to in Clause 3.4.3.2.(1)(a), (b) or (c) is replaced with a new examination, the *director* shall give notice of the new examination to every *registered* person who is registered in a class of registration set out in Column 1 of Table 3.5.2.2. to which the examination relates.

(2) The *director* may give the notice referred to in Sentence (1) by sending it by regular letter mail to the last address of the *registered* person that has been provided to the *director*.

3.4.3.9. Suspension, Revocation, Refusal to Register or Renew a Registration

(1) The *director* may, in the circumstances set out in Sentence (2),

(a) refuse to register an applicant,

(b) refuse to renew a registration, or

(c) suspend or revoke a registration.

(2) The circumstances referred to in Sentence (1) are,

(a) the *registered* person is in contravention of the Act or this Code,

(b) the *registered* person is in breach of a condition of the registration other than the condition set out in Clause 3.4.3.7.(1)(d),

(c) the registration was issued on the basis of mistaken, false or incorrect information,

(d) the *director* is of the opinion that the past conduct of the applicant or *registered* person or, if the applicant or *registered* person is a partnership or a corporation, the partners, officers or directors of the *registered* person, as the case may be, affords reasonable grounds for belief that the business that would be or is authorized by the registration will not be carried on in accordance with law,

(e) the *director* is of the opinion that there are reasonable grounds for belief that the activities of the applicant or *registered* person are or will be carried on in a manner that poses a threat to public safety,

(f) the application is incomplete, or

(g) any fees required under Article 3.4.3.5. remain unpaid.

(3) If the *director* proposes to refuse to register or renew a registration or proposes to suspend or revoke a registration under Sentence (1), the *director* shall serve a notice of the proposal, together with the reasons for it, on the applicant or *registered* person.

(4) A notice under Sentence (3) shall state that the applicant or *registered* person is entitled to a hearing before the *Tribunal* if the applicant or *registered* person, within 15 days after service of the notice referred to in Sentence (3), serves the *director* and the *Tribunal* with notice in writing requesting a hearing.

(5) If an applicant or *registered* person does not request a hearing by the *Tribunal* in accordance with Sentence (4), the *director* may carry out the proposal stated in the notice under Sentence (3).

(6) If an applicant or *registered* person requests a hearing before the *Tribunal* in accordance with Sentence (4), the *Tribunal* shall appoint a time for and hold a hearing and may by order direct the *director* to carry out the *director's* proposal or refrain from carrying it out and to take such other action as the *Tribunal* considers the *director* ought to take in accordance with the Act and this Code, and for those purposes the *Tribunal* may substitute its opinion for that of the *director*.

(7) The *director*, the applicant or *registered* person who requested the hearing, and such other persons as the *Tribunal* may specify, are parties to proceedings before the *Tribunal*.

(8) A proposal to suspend or revoke a registration by reason of Clause (2)(e) takes effect immediately and the commencement of a proceeding before the *Tribunal* does not stay the operation of the proposal to suspend or revoke the registration.

(9) The *Tribunal* may, on the application of the *registered* person, stay the operation of the proposal of the *director* to suspend or revoke the registration, and may grant the stay subject to conditions.

(10) Sentences (3) to (9) do not apply and the *director* may cancel the registration of a *registered* person upon receipt of a request in writing for cancellation from the *registered* person in a form established by the *director*.

(11) Subject to Sentence (8), if within the time period set out in Sentence 3.4.3.3.(2) a *registered* person has applied for renewal of a registration, paid the fee required under Article 3.4.3.5. and provided evidence satisfactory to the *director* that the *registered* person is covered by insurance required under Subsection 3.6.2. for the term of the renewal of the registration, the registration shall be deemed to continue until the earliest of,

(a) the day the registration is renewed,

(b) if the *registered* person is served with notice that the *director* proposes to refuse to renew the registration, the day the time for giving notice requesting a hearing expires or, if a hearing is held, the day the *Tribunal* makes its order, and

(c) the day when the *registered* person ceases to be covered by the insurance required under Subsection 3.6.2.

3.4.3.10. Mandatory Suspension or Revocation of Registration or Refusal to Register or Renew a Registration

(1) The *director* shall, in the circumstances set out in Sentence (2),

(a) refuse to register an applicant,

(b) refuse to renew a registration, or

(c) suspend or revoke a registration.

(2) The circumstances referred to in Sentence (1) are,

(a) the *registered* person is not covered by the insurance required under Subsection 3.6.2., or

(b) an order under subsection 69 (2) of the *Provincial Offences Act* is in effect directing that the registration of the person be suspended and that no registration be issued to that person until a fine is paid.

(3) If the *director* refuses to register an applicant, refuses to renew a registration or suspends or revokes a registration under Sentence (1), the *director* shall serve a notice of the refusal, suspension or revocation, together with the reasons for it, on the *registered* person.

(4) A suspension or revocation of a registration under Sentence (1) takes effect immediately and the commencement of a proceeding before the *Tribunal* does not stay the operation of the suspension or revocation of the registration.

(5) The *Tribunal* may, on the application of the *registered* person, stay the operation of a decision of the *director* to suspend or revoke the registration, and may make the stay subject to conditions.

(6) A notice under Sentence (3) shall state that the *registered* person is entitled to a hearing before the *Tribunal* if the *registered* person, within 15 days after service of the notice referred to in Sentence (3), serves the *director* and the *Tribunal* with notice in writing requesting a hearing.

(7) If a *registered* person requests a hearing before the *Tribunal* in accordance with Sentence (6), the *Tribunal* shall appoint a time for and hold a hearing and may by order confirm, alter or revoke the decision of the *director* to refuse to register or to suspend or revoke the registration and may take such action as the *Tribunal* considers the *director* ought to take in accordance with the Act and this Code, and for such purposes the *Tribunal* may substitute its opinion for that of the *director*.

(8) The *director* and the *registered* person who requested the hearing, and such other persons as the *Tribunal* may specify, are parties to proceedings before the *Tribunal*.

3.4.4. Public Register

3.4.4.1. Public Register

(1) The *director* shall establish and maintain a register available to the public listing every person who has the qualifications required by subsection 15.11 (4) of the Act.

(2) The register referred to in Sentence (1) shall contain the following information in respect of every *registered* person:

(a) the name of the *registered* person,

(b) any identifying number assigned by the *director* to the *registered* person,

(c) the business address of the *registered* person,

(d) the classes of registration of the *registered* person, and

(e) the names of any persons who will exercise powers and perform functions under the Act on behalf of the *registered* person in each class of registration and any identifying number assigned by the *director* to that person.

3.4.5. Classes of Registration and Categories of Qualifications

3.4.5.1. Classes and Categories

(1) Table 3.5.2.2. contains the classes of registration and categories of qualifications for the purposes of this Section.

Section 3.5. Classes of Registration and Categories of Qualifications

3.5.1. Scope

3.5.1.1. Scope

(1) This Section sets out classes of registration and categories of qualifications for the purposes of Sections 3.1., 3.2., 3.4. and 3.7.

3.5.2. Classes of Registration and Categories of Qualifications

3.5.2.1. Inspectors and Persons Who Carry out Design Activities

(1) Table 3.5.2.1. sets out the classes of registration and categories of qualifications for persons who carry out *design activities* and the categories of qualifications for *inspectors*.

Table 3.5.2.1.
Classes of Registration and Categories of Qualifications
For Inspectors and Persons Who Carry Out Design Activities

Forming Part of Sentence 3.5.2.1.(1)

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
Row Number	Classes of Registration for Persons Engaged in the Business of Providing *Design Activities* to the Public	Categories of Qualifications for *Inspectors* and Persons Described in Clauses 3.2.4.2.(1)(a) and (b) and 3.2.5.1.(1)(a)	Type of *Building*
1	House	House	(a) A detached house, semi-detached house, townhouse or row house containing not more than two *dwelling units* in each house and the *building* systems, works, fixtures and service systems appurtenant to these *buildings*, including: (b) an ancillary *building* that serves the *building*, and excluding: (c) *buildings* and parts of *buildings* described in Column 4 of any of Rows 5, 6, 7, 8, 10 and 11 of this Table.
2	Small *Buildings*	Small *Buildings*	(a) *Buildings* described in Sentence 1.1.2.4.(1) of Division A and the *building* systems, works, fixtures and service systems appurtenant to these *buildings*, including: (b) *buildings* and parts of *buildings* (i) described in Column 4 of Row 1 of this Table, or (ii) to which any of Sections 3.10., 3.11., 3.12., 3.14. and 3.15. of Division B apply and that are appurtenant to or serve *buildings* described in Clause (a), excluding: (c) *buildings* and parts of *buildings* described in Column 4 of any of Rows 4 to 10 of this Table.
3	Large *Buildings*	Large *Buildings*	(a) *Buildings* described in Sentence 1.1.2.2.(1), (3) or (4) of Division A and the *building* systems, works, fixtures and service systems appurtenant to these *buildings*,

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
Row Number	Classes of Registration for Persons Engaged in the Business of Providing *Design Activities* to the Public	Categories of Qualifications for *Inspectors* and Persons Described in Clauses 3.2.4.2.(1)(a) and (b) and 3.2.5.1.(1)(a)	Type of *Building*
			excluding: (b) *buildings* and parts of *buildings* described in Column 4 of any of Rows 4 to 11 of this Table.
4	Complex *Buildings*	Complex *Buildings*	*Building* systems, works, fixtures and service systems to which Subsection 3.2.6. of Division B or any provision in Articles 3.2.8.3. to 3.2.8.11. of Division B apply.
5	*Plumbing* – House	*Plumbing* - House	All *plumbing* systems to which Part 7 of Division B applies that are appurtenant to a *building* that is a detached house, semi-detached house, townhouse or row house containing not more than two *dwelling units* in each house.
6	*Plumbing* - All *Buildings*	*Plumbing* - All *Buildings*	(a) All *plumbing* systems to which Part 7 of Division B applies, including: (b) *buildings* and parts of *buildings* described in Column 4 of Row 5 of this Table.
7	HVAC – House	HVAC – House	All *building* systems, works, fixtures and service systems to which Section 9.32. or 9.33. of Division B applies that are appurtenant to a *building* that is a detached house, semi-detached house, townhouse or row house containing not more than two *dwelling units* in each house.
8	*Building* Services	*Building* Services	(a) *Building* systems, works, fixtures and service systems that are appurtenant to *buildings* described in Sentence 1.1.2.2.(1), (3) or (4) or Sentence 1.1.2.4.(1) of Division A and that relate to fire suppression, fire detection, smoke control, exhaust, vertical movement of smoke, energy efficiency, lighting and emergency power, and (b) *building* systems, works, fixtures and service systems appurtenant to *buildings* to which Part 6 of Division B applies or to which Section 9.32. or 9.33. of Division B applies, including: (c) *buildings* and parts of *buildings* described in Column 4 of Row 7 or 11 of this Table.
9	*Building* Structural	*Building* Structural	Internal and external *loadbearing* structural elements essential to the stability or strength of a *building* described in Sentence 1.1.2.2.(2) or Sentence 1.1.2.4.(1) of Division A and that resist *dead loads* or *live loads* including, but not limited to, *foundations*, floors, walls, roofs, columns and beams.
10	On-site *Sewage Systems*	On-site *Sewage Systems*	*Sewage systems* to which Part 8 of Division B applies.
11	Detection, Lighting and Power	Detection, Lighting and Power	Early warning and electrical systems including systems appurtenant to *buildings* described in Sentence 1.1.2.2.(1) or Sentence 1.1.2.4.(1) of Division A and that relate to fire alarm and detection systems, voice communication systems, lighting systems, emergency lighting systems or emergency power systems for *building* services in all *buildings*.
12	Fire Protection	Fire Protection	Fire suppression, fire detection, fire fighting and fire safety systems appurtenant to *buildings* described in Sentence 1.1.2.2.(1) or Sentence 1.1.2.4.(1) of Division A.

Notes to Table 3.5.2.1.:

(1) An *inspector* qualified in one category of qualification may carry out plans review and inspection in another category where to do so does not constitute a substantial part of the plans review or inspection on any project.

(2) A person registered in one class of registration or a person qualified in one category of qualification may carry out *design activities* in another class or category where to do so does not constitute a substantial part of the *design activities* on any project.

3.5.2.2. Registered Code Agencies

(1) Table 3.5.2.2. sets out the classes of registration for *registered code agencies* and the categories of qualifications for persons described in Clauses 3.4.3.2.(1)(a) to (c)

Table 3.5.2.2.
Classes of Registration and Categories of Qualifications Registered Code Agencies

Forming Part of Sentence 3.5.2.2.(1)

COLUMN 1	COLUMN 2	COLUMN 3
Classes of Registration for *Registered Code Agencies*	Category of Qualification for Persons Described in Clauses 3.4.3.2.(1)(a) to (c)	Type of *Building* Reference to Table 3.5.2.1.
House	House	Column 4 of Row 1
	Plumbing - House	Column 4 of Row 5
	HVAC - House	Column 4 of Row 7
	On-Site *Sewage Systems*	Column 4 of Row 10
Small *Buildings*	Small *Buildings*	Column 4 of Row 2
	Plumbing - All *Buildings*	Column 4 of Row 6
	Building Services	Column 4 of Row 8
	Building Structural	Column 4 of Row 9
	On-Site *Sewage Systems*	Column 4 of Row 10
Large *Buildings*	Large *Buildings*	Column 4 of Row 3
	Plumbing - All Buildings	Column 4 of Row 6
	Building Services	Column 4 of Row 8
	Building Structural	Column 4 of Row 9
	On-site *Sewage Systems*	Column 4 of Row 10
Complex Buildings	Complex *Buildings*	Column 4 of Row 4
	Plumbing - All *Buildings*	Column 4 of Row 6
	Building Services	Column 4 of Row 8
	Building Structural	Column 4 of Row 9
	On-site *Sewage Systems*	Column 4 of Row 10
On-site *Sewage Systems*	On-site *Sewage Systems*	Column 4 of Row 10

Section 3.6. Insurance

3.6.1. Scope

3.6.1.1. Scope

(1) This Section prescribes, for the purposes of subsection 15.13 (1) of the Act, the insurance coverage that *registered code agencies* and persons referred to in subsection 15.11 (5) of the Act must have.

3.6.2. Insurance for Registered Code Agencies and Persons Referred to in Subsection 15.11 (5) of the Act

3.6.2.1. Definition

(1) In this Subsection, *registered person* means a person who is registered under Article 3.2.4.2. or 3.4.3.2.

3.6.2.2. Scope

(1) Every person registered under Article 3.2.4.2. or 3.4.3.2. shall have insurance coverage under an insurance policy that satisfies the requirements set out in Article 3.6.2.3.

3.6.2.3. Insurance Coverage

(1) The insurance policy,

(a) shall indemnify the *registered person* against liability imposed by law arising out of the performance of or the failure to perform services as a *registered person* during any time while the person is registered under Article 3.2.4.1. or 3.4.3.2. for claims that are first made and reported to the insurer during the period of insurance or during any extended reporting period required by Clause (1)(c),

(b) shall set out the name of the *registered person*,

(c) in the case of a *registered code agency* registered under Article 3.4.3.2.,

(i) shall require an extended reporting period of two years for the purposes of giving notice of any claim or occurrence that the *registered code agency* could reasonably foresee might give rise to a claim, with respect to an event that occurs prior to the person ceasing to be insured,

    (ii) shall provide that the extended reporting period described in Subclause (i) shall commence on the day the *registered code agency* ceases to be insured, and

    (iii) shall require the *registered code agency* to make full payment of all premiums for the extended reporting period referred to in Subclause (i) as part of the premiums for the issuance of the insurance policy,

(d) shall provide for insurance coverage to commence,

    (i) on the date the *registered person* becomes registered, or

    (ii) in the case of a *registered person* previously insured in accordance with this Article, on the expiry of the previous policy,

(e) shall require the insurer to provide prompt written notice to the *director* if the policy is declared void for material misrepresentation,

(f) shall specify a limit of indemnity for any one claim and in the aggregate during any one period of insurance that is not less than,

    (i) in the case of persons registered under Article 3.2.4.2.,

        (A) $1,000,000 per claim and $2,000,000 in the aggregate, if the person billed $100,000 or more in fees in the 12 months immediately before the issuance of the policy,

        (B) $500,000 per claim and $1,000,000 in the aggregate, if the person billed more than $50,000 and less than $100,000 in fees in the 12 months immediately before the issuance of the policy,

        (C) $250,000 per claim and $500,000 in the aggregate, if the person billed $50,000 or less in fees in the 12 months immediately before the issuance of the policy, or

        (D) the limits of indemnity for any one claim and in the aggregate that are set out in Sub-subclause (A), (B) or (C), as determined by reference to the person's estimated fees billings for the 12-month period immediately after the issuance of the policy, if the person has been registered less than one year before the issuance of the policy, and

    (ii) in the case of a *registered code agency* registered under Article 3.4.3.2., $1,000,000 per claim and $2,000,000 in the aggregate, except that those limits shall apply exclusively to the exercise of the powers and performance of the duties of a *registered code agency* under the Act and shall be in addition to any insurance applicable to any other activities carried on by the *registered code agency*,

(g) shall provide that any costs and expenses necessarily incurred by the insurer in the investigation, defence or settlement of claims under the policy shall not be part of the limit of indemnity set out in Clause (f) unless the limit of indemnity from any one claim exceeds $2,000,000,

(h) shall not provide that the insured shall be responsible for the first portion of any sum that the insured becomes legally liable to pay in respect of a claim made against him, her or it in respect of any one claim or occurrence in an amount exceeding the lesser of,

    (i) $70,000, and

    (ii) 5% of,

        (A) the amount of fees billed by the insured in the 12 months immediately before the issuance of the policy, or

        (B) the amount of the insured's estimated fees billings for the 12-month period immediately after the issuance of the policy, if the insured has been registered under Article 3.2.4.2. less than one year before the issuance of the policy,

(i) shall provide that it cannot be cancelled by the insured unless,

    (i) the insured immediately replaces the policy with another policy that satisfies the requirements of this Article,

    (ii) the insurer has given notice in writing of the proposed cancellation to the *director*, and

    (iii) the notice described in Subclause (ii) was received by the *director* at least 30 days before the day the policy is cancelled,

(j) shall provide that it cannot be cancelled by the insurer unless,

    (i) it is cancelled for non-payment of a premium,

    (ii) the insurer has given notice in writing of the proposed cancellation to the *director*, and

    (iii) the notice described in Subclause (ii) was sent to the *director* at least 30 days before the day the policy is cancelled,

(k) shall provide for the continuation of coverage if the insured is adjudged a bankrupt, insolvent, incompetent or dies during the period of insurance, and

(l) may provide that coverage be subject to such exclusions and conditions and otherwise on such terms as are consistent with normal insurance industry practice from time to time.

Section 3.7. Registered Code Agencies

3.7.1. Appointment of Registered Code Agency under Section 4.1 of the Act

3.7.1.1. Agreements

(1) An agreement between a *principal authority* and a *registered code agency* under subsection 4.1 (1) of the Act shall be made in writing and shall,

(a) specify the functions that the *registered code agency* is authorized to perform,

(b) specify the *construction* of the *building* or class of *buildings* in respect of which the functions will be performed,

(c) set out the procedure by which the *principal authority* will appoint the *registered code agency* to perform specified functions in respect of the *construction* of a *building* or class of *buildings*,

(d) require that the *registered code agency* carry out its functions under the agreement in accordance with the Act and this Code and the quality management plan described in Clause 3.4.3.2.(1)(d),

(e) provide for the provision by the *principal authority* to the *registered code agency* of such plans, specifications and other information, including applications for permits, that the *registered code agency* may require in order to act under the appointment.

(2) An agreement under Subsection (1),

(a) may contain provisions in addition to the provisions required under Subsection (1) if the additional provisions are not inconsistent with the provisions required under that Subsection, and

(b) shall not contain any provision that relates to the *construction* of *buildings* for a class of registration for which the *registered code agency* is not registered under Section 3.4.

3.7.1.2. Appointments

(1) An appointment under subsection 4.1 (2) of the Act by a *principal authority* of a *registered code agency* to perform specified functions in respect of the *construction* of a *building* or class of *buildings* shall be made in writing and shall,

(a) specify the *construction* of the *building* or class of *buildings* in respect of which the appointment relates,

(b) specify the functions described in section 15.15 of the Act that the *registered code agency* is appointed to perform, and

(c) require that the *registered code agency* carry out its functions under the appointment in 3.4.3.2.(1)(d).

(2) An appointment described in Subsection (1) may contain provisions in addition to the provisions required under Subsection (1) if the additional provisions are not inconsistent with the provisions required under that Subsection.

3.7.2. When a Registered Code Agency may not be Appointed or Continue to Act under an Appointment

3.7.2.1. General

(1) A *registered code agency* may not be appointed to perform functions under section 15.15 of the Act in respect of a *building* or continue to act under an appointment in respect of a *building* if the *registered code agency*,

(a) is not registered under Section 3.4. in respect of the class of registration to which the *construction* of the *building* relates, or

(b) is in breach of a condition of its registration under Article 3.4.3.7.

(2) Where under Section 1.2. the design and general review of *construction* of a *building* must be undertaken by an *architect* or *professional engineer* or both, a *registered code agency* may not be appointed to perform functions under section 15.15 of the Act or continue to act under an appointment in respect of the *construction* of the *building* unless the *registered code agency* or an officer, director, partner or employee of the *registered code agency* is an *architect* or *professional engineer* or both, as the case may be.

(3) A *registered code agency* shall not be appointed under the Act or continue to act under an appointment if the *registered code agency* would be in a conflict of interest.

(4) For the purposes of Sentence (3), a *registered code agency* would be in a conflict of interest if the *registered code agency* or an officer, director, partner or employee of the *registered code agency* or any person engaged by the *registered code agency* to perform functions for it,

(a) has participated or participates, in any capacity, in *design activities* or *construction* relating to any part of the *building* to which an appointment relates,

(b) is or has been employed within the previous 180 days by a person who carried out *design activities* or *construction* relating to any part of the *building*,

(c) has a professional or financial interest in,

  (i) the *construction* of the *building* to which the appointment relates,

  (ii) the *building* to which the appointment relates, or

  (iii) the person responsible for the design of the *building* to which the appointment relates,

(d) is an elected official, officer or employee of a *principal authority*.

(5) For the purposes of Clause (4)(c), involvement with a *building* as a *registered code agency* and entitlement to any fee paid for acting as a *registered code agency* in respect of a *building* shall not be considered to be a professional or financial interest in the *construction* of the *building*, the *building* or the person responsible for the design of the *building*.

3.7.3. Additional Functions that Registered Code Agencies may be Appointed to Perform

3.7.3.1. General

(1) In addition to the functions described in paragraphs 1 to 5 of section 15.15 of the Act, a *registered code agency* may be appointed to perform the functions set out in Sentence 3.7.4.3.(5).

3.7.4. Manner in which Registered Code Agency shall Perform Functions

3.7.4.1. General

(1) The *registered code agency* shall perform the functions specified in an appointment in accordance with the Act and this Code and the quality management plan referred to in Clause 3.4.3.2.(1)(d).

(2) The *registered code agency* shall perform the functions specified in an appointment in accordance with the code of conduct set out in Supplementary Standard SC-1.

3.7.4.2. Plans Review and Inspection Activities

(1) The *registered code agency* shall ensure that plans review and inspection activities of the *registered code agency* are carried out by a person who has the qualifications set out in Clause 3.4.3.2.(1)(b) or (c) in respect of the type of *building* set out in Column 3 of Table 3.5.2.2. for which the person is carrying out the activities.

(2) Not more than 180 days after the day a notice is given under Sentence 3.4.3.8.(1) by the *director* to the *registered code agency*, the *registered code agency* shall,

(a) ensure that plans review and inspection activities of the *registered code agency* in the category of qualification to which the notice relates are carried out by persons who have successfully completed all new examinations referred to in the notice, and

(b) provide the following information to the *director*:

  (i) the name and residence address of the person, and

  (ii) information required by the *director* about the examinations that the person or persons have successfully completed.

(3) A *registered code agency* shall prepare written records of every inspection of the *construction* of a *building* that is undertaken by the *registered code agency* in the course of performing functions under an appointment.

(4) The record required under Sentence (3) shall include,

(a) the date of receipt of the notice of readiness for inspection, if any,

(b) the date of the inspection,

(c) the reason for the inspection,

(d) whether non-compliance with this Code was observed in the course of the inspection and the details of the non-compliance.

(5) If a *registered code agency* has issued an order under subsection 12 (2), 13 (1) or 13 (6) of the Act, the *registered code agency* shall prepare a written record consisting of,

(a) a copy of the order,

(b) the persons on whom the order was served and the date and manner of service,

(c) when and how the order was complied with, and

(d) if the order has not been complied with, the efforts made by the *registered code agency* to achieve compliance by the persons responsible for compliance.

3.7.4.3. Issuance of Certificates by Registered Code Agencies

(1) Subject to Sentence (2), every certificate issued under the Act by a *registered code agency* shall, in accordance with the quality management plan referred to in Clause 3.4.3.2.(1)(d), be signed by the *registered code agency* or, if the *registered code agency* is a corporation or partnership, by a person described in Clause 3.4.3.2.(1)(a).

(2) If the certificate is issued in respect of the *construction* of a *building* that would under Section 1.2.1. be required to be designed by and under the general review of an *architect* or *professional engineer* or both, the certificate shall also be signed on behalf of the *registered code agency* by an *architect* or a *professional engineer* or both, as the case may be, who is an officer, director, partner or employee of the *registered code agency*.

(3) A *registered code agency* may issue a *plans review certificate* if the *registered code agency*,

(a) has been appointed to perform the functions described in clause 4.1 (4) (a) or (c) of the Act in respect of the proposed *construction* of the *building* to which the *plans review certificate* applies,

(b) has, in conformity with the Act, this Code and the quality management plan described in Clause 3.4.3.2.(1)(d), carried out the applicable functions for which the *registered code agency* was appointed, and

(c) is satisfied on reasonable grounds that, on date on which the *plans review certificate* is issued, the proposed *construction* of the *building* to which the *plans review certificate* relates is in compliance with this Code.

(4) A *registered code agency* may issue a *change certificate* if the *registered code agency*,

(a) has been appointed to perform the functions described in clauses 4.1 (4) (a) to (c) of the Act in respect of the *construction* or proposed *construction* of the *building* to which the *change certificate* applies,

(b) has, in conformity with the Act, this Code and the quality management plan described in Clause 3.4.3.2.(1)(d) , carried out the applicable functions for which the *registered code agency* was appointed, and

(c) is satisfied on reasonable grounds that, on the date on which the *change certificate* is issued, the proposed *construction* of the *building* to which the *change certificate* relates is in compliance with this Code.

(5) A *registered code agency* may issue a *certificate for the occupancy of a building not fully completed* if the *registered code agency*,

(a) has been appointed to perform the functions described in clause 4.1 (4) (b) or (c) of the Act in respect of the *construction* of the *building* to which the *certificate for the occupancy of a building not fully completed* applies,

(b) has, in conformity with the Act, this Code and the quality management plan described in Clause 3.4.3.2.(1)(d), carried out the applicable functions for which the *registered code agency* was appointed, and

(c) is satisfied on reasonable grounds that, on the date on which the *certificate for the occupancy of a building not fully completed* is issued, the *construction* of the *building* to which the *certificate for the occupancy of a building not fully completed* relates is in compliance with Clauses 1.3.3.1.(2)(a) to (q).

(6) A *registered code agency* may issue a *final certificate* if the *registered code agency*,

(a) has been appointed to perform the functions described in clause 4.1 (4) (b) or (c) of the Act in respect of the *construction* of the *building* to which the *final certificate* applies,

(b) has, in conformity with the Act, this Code and the quality management plan described in Clause 3.4.3.2.(1)(d), carried out the applicable functions for which the *registered code agency* was appointed, and

(c) is satisfied on reasonable grounds that on the date on which the *final certificate* is issued, the *construction* of the *building* to which the *final certificate* relates is in compliance with this Code.

(7) Every certificate issued under the Act by a *registered code agency* shall be in a form approved by the *Minister*.

3.7.4.4. Issuance of Orders by Registered Code Agencies

(1) Orders under subsections 13 (6) and 14 (1) of the Act shall, in accordance with the quality management plan described in Clause 3.4.3.2.(1)(d), be signed by the *registered code agency* or a person described in Clause 3.4.3.2.(1)(a).

(2) Orders under subsections 12 (2) and 13 (1) and clause 18 (1) (f) of the Act shall, in accordance with the quality management plan described in Clause 3.4.3.2.(1)(d), be signed by the *registered code agency* or by a person described in Clause 3.4.3.2.(1)(b) or (c).

3.7.4.5. Authorized Persons

(1) Persons who possess the qualifications described in Clauses 3.4.3.2.(1)(a), (b) and (c) are prescribed for the purposes of subsection 15.17 (1) of the Act.

(2) The certificate of authorization referred to in subsection 15.17 (2) of the Act shall, in accordance with the quality management plan described in Clause 3.4.3.2.(1)(d), be signed by a representative of the *registered code agency* who is described in Clause 3.4.3.2.(1)(a) and shall contain the following information:

(a) the name of the *registered code agency* and any identifying number issued by the *director* to the *registered code agency*,

(b) the title, business address and business telephone number of a representative of the *registered code agency* who may be contacted to answer questions about the certificate and the authorization to which it relates,

(c) the name of the authorized person and any identifying number issued by the *director* to the authorized person in respect of that person's qualifications,

(d) the scope of the powers that may be exercised and the functions that may be performed by the authorized person,

(e) the date of issuance of the certificate.

(3) Every person described in Sentence (1) shall carry his or her certificate of authorization when performing duties and shall produce the certificate for inspection upon request.

3.7.4.6. Prohibition

(1) A *registered code agency* shall not dismiss, suspend, demote, discipline, harass or otherwise disadvantage an employee, or deny an employee a benefit of employment, by reason that,

(a) the employee, acting in good faith and on the basis of reasonable belief, has disclosed to the *director* that the *registered code agency* or any other person has contravened or intends to contravene a provision of the Act or this Code,

(b) the employee, acting in good faith and on the basis of reasonable belief, has refused or stated an intention of refusing to do anything that is a contravention of a provision of the Act or this Code,

(c) the employee, acting in good faith and on the basis of reasonable belief, has done or stated an intention of doing anything that is required to be done in order that a provision of the Act or this Code not be contravened, or

(d) the *registered code agency* believes that the employee will do anything referred to in Clause (a), (b) or (c).

(2) Nothing in this Section impairs any right of an employee either at law or under an employment contract or collective agreement.

(3) In this Article,

"employee" includes an independent contractor and "employer" includes the person who retains an employee who is an independent contractor.

3.7.4.7. Information and Records

(1) The *registered code agency* shall maintain records of all plans review and inspection activity, of all certificates and orders and of any other activities taken in carrying out functions under an appointment in accordance with the quality management plan described in Clause 3.4.3.2.(1)(d).

(2) Any information collected by a *registered code agency* in the course of the exercise of powers and the performance of duties under this Act may be used only for the purpose of performing functions under an appointment under subsection 4.1 (2) of the Act and may be disclosed only,

(a) to a *principal authority* pursuant to an agreement under subsection 4.1 (1) of the Act,

(b) to a *principal authority* to aid the enforcement in any manner of the Act,

(c) where required or permitted under this Act, this Code, other applicable legislation or an order of a court.

(3) A *registered code agency* shall ensure that any agreement under which the *registered code agency* engages a person to assist the *registered code agency* to perform functions under an appointment includes a provision that requires the person to comply with Sentences (1) and (2).

3.7.5. Termination of Appointment of a Registered Code Agency

3.7.5.1. Termination of an Appointment Made under Subsection 4.1 (2) of the Act

(1) A *principal authority* may, in accordance with the terms of an agreement under subsection 4.1 (1) of the Act, terminate the appointment of a *registered code agency* before the appointment expires under section 15.19 of the Act.

3.7.6. Information to be Provided

3.7.6.1. Information to be Provided by a Principal Authority to the Director

(1) If a *principal authority* that has appointed a *registered code agency* terminates the appointment before the appointment expires under section 15.19 of the Act, the *principal authority* shall, as soon as possible after the termination, give the *director* notice of the termination and such other information concerning the circumstances of the termination and as may be required by the *director*.

(2) If a *principal authority* has issued an order under subsection 15.21 (1) of the Act, the *principal authority* shall as soon as possible after the order is issued give the *director* a copy of the order and such other information concerning the circumstances of the order and as may be required by the *director*.

3.7.6.2. Information to be Provided by a Registered Code Agency to the Director

(1) A *registered code agency* that becomes or expects to become unable to carry out the functions for which the *registered code agency* was appointed shall as soon as possible give notice to the *director* of this situation.

3.7.6.3. Information to be Provided by a Registered Code Agency to the Chief Building Official

(1) A *registered code agency* shall notify the *chief building official* if the *registered code agency* becomes or expects to become unable to carry out the functions for which the *registered code agency* was appointed.

(2) A *registered code agency* shall give copies of the following records to the *chief building official*,

(a) all orders issued by the *registered code agency* under subsections 12 (2), 13 (1) and 13 (6) of the Act,

(b) all written records prepared by the *registered code agency* under) 3.7.4.2.(3) and (4),

(c) all *final certificates* that are issued by the *registered code agency*,

(d) records described in Section 3.1. relating to the use of an alternative solution, and

(e) any records of information, copies of documents or things, tests, samples or photographs produced, removed, required, taken or ordered to be taken under subsection 18 (1) of the Act.

(3) The documents referred to in Sentence (2) shall be given to the *chief building official*,

(a) within the time period specified in any agreement under Article 3.7.1.1. or appointment under Article 3.7.1.2. in respect of which the documents relate, whichever time period ends earlier,

(b) within 15 days after the expiry or termination of the appointment of the *registered code agency* in respect of which the documents relate, if there is no time period specified in the agreement or appointment referred to in Clause (a), or

(c) if the *chief building official* has given notice to the *registered code agency* that he or she requires the documents before the time set out in Clause (a) or (b), within 2 days after the request for documents.

(4) The requirements of Sentence (2) apply even if the *registered code agency* is no longer registered under Subsection 3.4.

(5) If a *registered code agency* in the course of carrying out functions under an appointment has reason to believe that a *building* described in Sentence (7) is unsafe within the meaning of subsection 15.9 (2) or (3) of the Act, the *registered code agency* shall as soon as possible give notice to the *chief building official* of,

(a) the location of the *building*, and

(b) the reason why the *registered code agency* has reason to believe that the *building* is unsafe.

(6) A *registered code agency* that has given a notice to the *chief building official* under Sentence (5) shall give the *chief building official* such other information about the unsafe condition as the *chief building official* may require.

(7) Sentence (5) applies to,

(a) a *building* in respect of which the *registered code agency* has been appointed to perform functions, and

(b) a *building* that has been adversely affected by *construction* of a *building* referred to in Clause (a).

(8) For the purposes of Sentence (3), a time period referred to in Clause (3)(a), (b) or (c),

(a) does not start until the day after the day on which the obligation to provide the documents arises, and

(b) does not include Saturdays, holidays and all other days on which the offices of the *principal authority* are not open for the transaction of business with the public.

3.7.7. Referral of Stop Work Order

3.7.7.1. Referral

(1) A *registered code agency* shall refer a matter under subsection 14 (5) of the Act to the *chief building official* by giving the *chief building official*, as soon as possible,

(a) a report that contains the following information:

(i) a copy of the order made under section 12 or 13 of the Act that was not complied with and of the order under subsection 14 (2) of the Act,

(ii) the persons on whom the orders were served and the date and manner of service, and

(iii) a statement that the orders have not been complied with, and

(b) such other information as the *chief building official* may require in respect of the matter that has been referred.

(2) The report under Clause (1)(a) shall be signed, in accordance with the quality management plan described in Clause 3.4.3.2.(1)(d), by the *registered code agency* or, if the *registered code agency* is a corporation or partnership, by a person described in Clause 3.4.3.2.(1)(a).

O. Reg. 350/06, Division C, Part 3.

PART 4
TRANSITION, REVOCATION AND COMMENCEMENT

Section 4.1. Transition Rule
4.1.1. Transition, December 2006

Section 4.2. Revocation
4.2.1. Revocation

Section 4.3. Commencement
4.3.1. Commencement

Section 4.1. Transition Rule

4.1.1. Transition, December 2006

4.1.1.1. Transition Rule

(1) Subject to Sentences (2) and (3), Ontario Regulation 403/97 (Building Code), as it read on December 30, 2006, is deemed to continue in force with respect to *construction*,

(a) for which a permit has been issued before December 31, 2006, or

(b) for which the working drawings, plans and specifications are substantially completed before December 31, 2006, and for which an application for a permit is made before March 31, 2007 under that Regulation, as it read on December 30, 2006.

(2) Sentence (1) does not apply unless the *construction* is commenced within six months after the permit is issued.

(3) Division C, except for Section 2.1 of that Division, applies to *construction* described in Sentence (1) and prevails over all provisions of Ontario Regulation 403/97 (Building Code), as it read on December 30, 2006.

Section 4.2. OMITTED (REVOKES OTHER REGULATIONS).

Section 4.3. OMITTED (PROVIDES FOR COMING INTO FORCE OF PROVISIONS OF THIS REGULATION).

O. Reg. 350/06, Division C, Part 4.